Twenty-Five Years of American Brewing

With an Illustrated History of American Beer

Dedicated to the Friends of

George Ehret.

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AMERICAN BREWING FROM 1635 TO 1866.

AMERICAN brewing is nearly coeval with European civilization in the New World; in fact, no sooner had the colonists gained a firm footing and laid the foundation for the production of the most indispensable means of subsistence than they bestirred themselves to secure the needful supply of malt liquors. At first, of course, brewing like baking—a kindred art, since beer is merely liquid bread—was a part of domestic industry, and nearly every head of a household was his own brewer. While the exact date of the beginning of brewing as a distinct calling cannot be ascertained, there is an abundance of historical evidence that among the very earliest acts of the colonial governments, those tending to encourage the establishment of public breweries were deemed of the greatest importance. It is no less certain that whenever such encouragement did not sufficiently stimulate private enterprise to bring about the desired end, or when other reasons (hereafter to be explained) made it desirable, the rulers of some of the colonial settlements seized upon this source of income themselves or granted monopolies to those private persons who intended to establish breweries. Thus Van Twiller, Governor of New Netherlands from 1633 to 1638, erected a brewery on the West India Company's farm, which extended north from what is now Wall Street to Hudson Street, and the Patroon of Rensselaerwyck (the present counties of Albany, Columbia and Rensselaer) established

a brewery at Beaverwyck (the present Albany), reserving to himself the exclusive privilege of supplying all licensed retailers. Connecticut was without a public brewery for a considerable time, because there, as Atwater's History has it, "a brew-house was regarded as an essential part of a homestead." The little community which had gathered around Roger Williams in Rhode Island established a public house, in 1638, which served the purposes of a brewery, a wine-room and a grocery store, and was placed under charge of Sergeant Baulston. At about the same time (1637), a law passed by the General Court of Massachusetts Bay conferred upon Captain Sedgwick—who had "*before this time set up a brew house at his greate charge*"—a monopoly of brewing. These unwise limitations, however, did not long withstand the pressure produced by increasing demand and insufficient supply, especially because it was not contemplated nor, in fact, possible to stop domestic brewing, and, furthermore, because every tapster—and there was quite a number of them scarcely two decades after the planting of the colonies—regarded it as his inherent right to brew his own beer. This conflict of interests, combined, in some instances, with a due regard for the public welfare, soon led to a systematic regulation of both brewing and tapping.

As this Director Van Twiller, mentioned above, is reputed to have been a hard drinker, ever intent on finding, or creating, a suitable occasion for indulging his weakness, it is not hazardous to surmise that in erecting a brewery, he consulted his own tastes quite as much as the needs of his little community. His example is said to have influenced the drinking-habits of the colonists to such an extent that drunkenness became a very common occurrence in the community. Captain De Vries narrates a number of incidents illustrating the weakness of Van Twiller, and among them is one which appears to

FRONT VIEW OF HELL GATE BREWERY.

deserve a place in this little sketch. Cornelius Van Voorst, the stem from which grew a numerous family famous in Manhattan and Jersey annals, was the superintendent of the colony of Pavonia, established by Pauwn. He was a man of hospitable inclinations, and had just imported a hogshead of Bordeaux wine. The rumor of its excellent quality reached the ears of Director-General Van Twiller, who, in company with Dominie Bogardus and Captain De Vries, paid the superintendent a visit by means of a rowboat. Van Voorst received the representatives of Church, State and Navy with a princely welcome. The cask was broached and the contents approved. After some hard drinking, a furious dispute about a recent murder arose between the host, the Governor and the Dominie. De Vries, the man of war, in this instance proved to be a man of peace, and by the joint efforts of himself and some more claret, a truce was finally effected and "they parted good friends." This is not the dull ending, but merely the prelude to something more brilliant. Just as his guests were entering their boat to depart, Van Voorst, to show his good will, caused a swivel, which was fixed on a pillar near the house, to be fired. It was a fine salute; but a piece of wadding, falling on the Van Voorst mansion, set fire to the roof. It was impossible to check the flames and the house was burned to the ground, presumably destroying the hogshead of wine!

The business of the tapster necessarily preceded that of the brewer; for before the colonists could raise a crop of the cereals necessary for brewing—which they did, by the way, according to Isaac Jogues' description of Novum Belgium, in the very first year after their settlement—they had to depend upon the supply of liquors shipped to them from the mother-country; and,

from all accounts, we learn that the quantities thus imported were very large and, to modern minds, entirely out of proportion to the very scant population of the colony. At the earliest times, the condition and surroundings of the colonists were such that all available means of subsistence had to be treated very much like common property. Thus the West India Company undertook, at first, to furnish the settlers with what they absolutely needed for their sustenance,—the understanding being that the value of goods so furnished must be returned by the borrower as soon as the product of his labor enabled him to do so. This accounts for the fact that the first tap-room on Manhattan Island was located in the first warehouse (see vignette) erected by Minuet, then Governor of New Netherland (1626–1633).

The number of tapsters, under Van Twiller's administration, increased rapidly; but there is no evidence that brewing kept pace with this growth—probably because the importation of wines and liquors from the mother-country still sufficed to satisfy the demand. When, however, in the first year of his administration (1638), Govornor Kieft forbade the retailing of wines and spirits by the tapsters, (virtually restricting the liquor traffic to the selling of beer), the brewing trade expanded to such an extent, that a few years later an excise upon its product yielded a considerable revenue. From this time onward, brewing and retailing formed the subjects of frequent legislation both in New Netherland and in the New England colonies. The law-makers not only regulated and taxed the manufacture and sale, but they also prescribed minutely the quality and price of beer, the time when, and circumstances under which, it could be sold; the duties of the tapster and the obligations of the drinker. Kieft forbade the tapping of beer during divine service and

after a certain hour at night; and, in order to remind the burghers and tapsters of the latter inhibition, he caused the town-bell to be rung—an imitation of the old European custom of announcing the hour for retiring. His object in introducing the curfew (the Norman *couvre feu)** was probably not confined to these things; it is quite likely that he intended thus to force upon the honest Dutch burghers the conviction that a man of strong will had come to assume the powers and functions which the licentious Van Twiller had permitted to be disregarded. Doubtless, Kieft honestly endeavored to correct the evils which had grown up under his predecessor's rule; but his motives were probably not always of a purely moral character. In forbidding the retailing of wine and confining its sale to the Company's ware house, "where," as he stated in his proclamation, "it could be obtained in moderate quantities and at a fair price," he intended, no doubt, to create for himself a monoply of this traffic; and in establishing a distillery on Staten Island—the first in New Netherland—he very likely sought to enlarge the scope of his monopoly. Fortunately, brewing had, by this time, grown too strong as an independent enterprise to be absorbed by the Company in this singularly arbitrary manner. It had become a favorite occupation, as a local historian justly says; and many of the best and most respected citizens engaged in it. Naturally enough, its rapid growth suggested

* The old German night-watchman's hourly song began with the announcement of the hour of the night, and the admonition to guard fire and light.

REAR VIEW OF HELL GATE BREWERY.

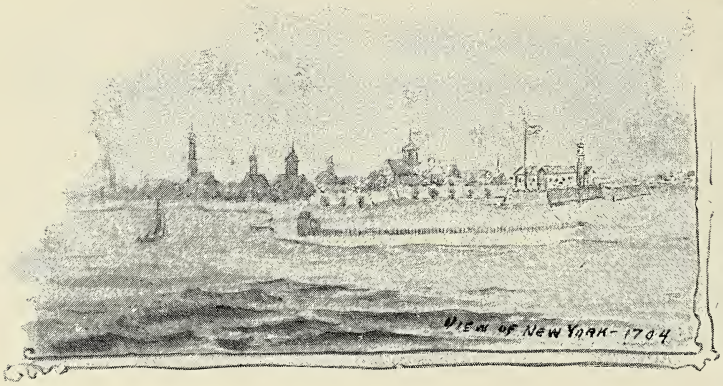
DUTCH TAVERN IN NEW YORK.

to Governor Kieft the expediency of levying a tax upon beer, and he imposed this all the more readily because, in consequence of the Indian War which he had provoked by a "shocking massacre of savages," the treasury was totally depleted. In 1644, he levied a tax of three guilders upon every tun of beer manufactured by a brewer, and of one florin upon every tun brewed by private citizens for their own use. Aware that the imposition of this or any other tax without the consent of the "Eight Men"—a sort of Assembly representing the people—would meet with little favor, he endeavored to propitiate the brewers by permitting them to sell their beer to tapsters at twenty florins per tun,—an increase over the old price almost covering the amount of the tax. The brewers, nevertheless, stoutly refused to pay the excise, and based their refusal upon the ground that the tax was imposed against the will of the representatives of the people and, therefore, contrary to what they conceived to be an inalienable right of every burgher. While their opposition to a government without the consent of the governed may not have been very clearly defined, the stout burghers of the colony fully understood that taxation without the consent of the taxed was an absolute wrong. The best historians accord in the opinion that the attitude of the brewers, at that stage of the political development of the Colonies, deserves the utmost praise and reflects all the more credit upon them, because the inducements held out to them by Kieft in the form of a permission to increase the price of their product ,might have prompted them to yield, if they had valued their profits more than the political rights of their fellow-citizens. The historian O'Callaghan,

DISTRIBUTING CONFISCATED BEER

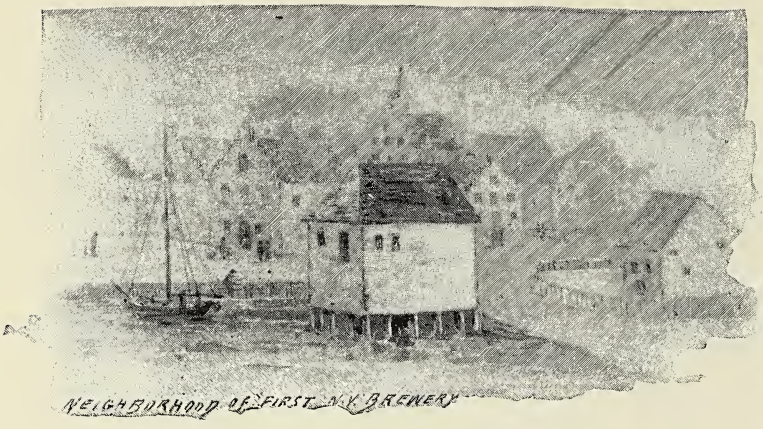
in his History of New Netherland, expresses this view in these words: "Kieft had no idea of being thwarted by such constitutional scruples. Judgment was given against the brewers, and thus another victory was achieved in New Netherland over popular rights." In all likelihood, the brewers expected that the protest which the Eight Men had openly raised against the excise would enable them to maintain their refusal to pay; but, while this expectation may have had the effect of inspiring them with a degree of temerity which would otherwise not have been aroused so readily, it detracts not a particle from the praiseworthiness of their action. At all events, if they calculated upon any leniency on Kieft's part, they reckoned without their host; for that arbitrary ruler not only disregarded the remonstrances of the Eight Men and insisted upon payment of the tax, but he even confiscated the whole stock of beer in the cellars of the recalcitrant brewers and gave it to the soldiers—partly as a prize and partly, no doubt, as an incentive to effective execution, on their part, in case of a popular demonstration. The brewers lost their beer and their case, but they were lauded as the champions of popular rights.

We have dwelt upon this incident at length, because it illustrates very strikingly the character of the persons then engaged in the time-honored art of brewing; although this would not have been necessary, for even a superficial examination of colonial history recalls the fact that many of the most prominent persons of those days—men whose descendants have made history—were engaged in brewing. The civic honors conferred upon so many of them in colonial times are evidences of the reputation which the brewers en-



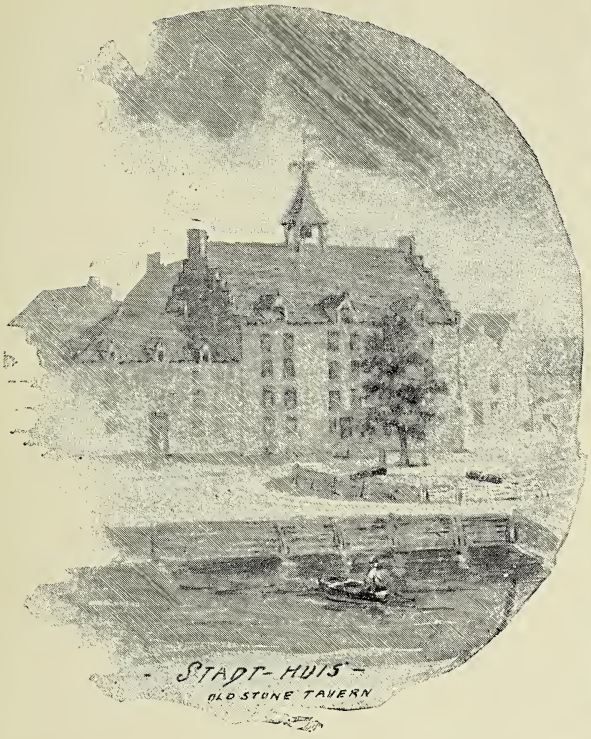
joyed in their community. To prove this assertion, we may be permitted to digress a little (though such digression must necessarily carry us beyond the period of Kieft's administration) in order to mention a few of the many Colonial brewers whose names are familiar to every New Yorker, even to this day. William Beekman, brewer, was successively schepen, burgomaster of New Amsterdam for nine years, vice-director of the colony on the Delaware, sheriff at Esopus, alderman, and again, sheriff under English dominion—holding office, with some interruption, for forty years. He continued the brewery of George Holmes, built in 1654, and died in 1707 at the age of 84. Beekman Street is named after him, and also (it is claimed) William Street. Peter W. Couwenhoven, brewer, was schepen in 1653 and 1654, and again 1658-'59 and 1661-'63. Nicholas aud Balthazar Bayard, brewers, held office between 1683 and 1687; the former as alderman and mayor, the latter as alderman. Petrus Rutger, brewer, was assistant alderman from 1730 to 1732. The Rutgers were a family of brewers. Jean Rutgers, their forefather, had a brewery in 1653, built probably earlier. Alice, daughter of Anthony Rutgers married Leonard Lispenard, and one of the latter's sons (Anthony) owned extensive breweries. The name of Lispenard, says a local historian, is merged in the families of Stewart, Webb, Livingstone, Winthrop, etc. John De Forrest, brewer, was schepen in 1658. Jacob Kip, brewer, was schepen from 1659 to 1665, and, again in 1673. His ancestors, the De Kypes, belonged to the oldest nobility of the Bretagne. Oloff S. Van Cortland, brewer, was burgomaster from 1653 to 1663 (thirteen years of continuous service), and alderman in 1666, 1667 and 1671. If certain genealogical charts (usually considered reliable) may be trusted, Van Cortland was a descendant of the Dukes of Courland, Russia.

OFFICES OF HELL GATE BREWERY.



He had a brewery in Stone Street, which in Dutch days was appropriately named Brouwer *i.e.* Brewer Street. His daughter, Maria, married Jeremiah Van Rensselaer—lord of the colony of Rensselaerwyck—who, also, was founder of a brewery, namely, the one at Beverwyck, before adverted to. Aert Teunison, a most influential man in his days, established the first brewery at Hoboken, and made beer for his neighbors until 1648, when he was killed by the Indians. Michael Janson, the progenitor of the large Vreeland family, was the first brewer at Pavonia, in 1654. Jacob Van Vleck, brewer, was alderman in 1684, 1685 and 1686. Martin Cregier, captain of the military company—a man of considerable importance, who commanded several exploring parties and subsequently became burgomaster—was the proprietor of a tavern opposite Bowling Green in 1653, and, doubtless, also practised brewing. We may now close this very incomplete list of prominent colonial brewers with the mention of one whose name is, and always has been, of uncommon interest to historians, seeing that he was the first white male born in New Netherland. Jean Vigne held the office of schepen during three terms. He followed the threefold occupation of brewer, miller and farmer, and owned a tract of land, the site of his brewery, near the Water-gate (present Wall Street).

We will now return to our narrative. At the time of the brewers' protest against the excise, the number of tapsters in New Amsterdam and the surrounding country was very large; but—singular as it may appear—there was but one tavern for the entertainment of strangers, and this one, a clumsy,stone building which Kieft had caused to be erected at the Company's expense in 1642. In that patriarchal spirit which characterized all his acts, he assumed



a close supervision over this primitive hotel, the patronage of which must have been all the more profitable, because the Governor, to prevent the influx of runaway servants and culprits, had prohibited the entertainment of strangers by private families for more than one night without his permission. This stone tavern was subsequently enlarged and fitted up for use as a Stadthuis (City Hall). During the remainder of his administration Kieft gave no further trouble to the brewers; but the tax continued to be collected.

When Kieft was recalled, and succeeded by Governor Stuyvesant, the abolition of the excise was asked for, but was peremptorily refused. The hope that the excise would be abolished had been raised by Kieft himself, who had promised the Eight Men that upon the arrival of his successor a change would be effected. Stuyvesant, however, had no such intentions; on the contrary, he at once imposed new taxes, inaugurated a system of excises and licenses, and introduced a number of innovations designed to bring the business under better control. Thus, he ordered the complete separation of brewing and tapping—forbidding brewers to retail, and tapsters to brew beer. Unlike his predecessor, he desired an improvement in the accommodations for travellers, and therefore ordered that tapsters and tavern-keepers should build better houses for the entertainment of guests. But, as the number of tapsters and spirit-venders had already grown too large, he refused to license new places. Stuyvesant's own report showed that, in 1651 or thereabouts, nearly the just fourth of the city of New Amsterdam consisted of

brandy-shops, tobacco or beer-houses! This was certainly an exaggerated statement; yet, from all other evidences, it must be inferred that the consumption of liquors was enormous. We find, at a fair calculation based on the two essential factors, viz.: amount of excise and population, that the tax paid for drink amounted to four guilders for every man, woman and child of the community. It will be readily understood that the law prohibiting brewing by tapsters yielded additional advantages to the brewers proper, and that the tapping of beer by brewers, in violation of the ordinance, occurred very rarely. Yet, so anxious was Stuyvesant to prevent evasions of his orders that he even forbade brewers to sell or give beer by the small measure to anyone—even to their boarders, "who, they pretended, came at meal times to eat with them." By way of additional safeguard, he required the brewers to obtain a permit from the Secretary of the Colony whenever they wished to remove beer from their brew-houses.

To enforce all these new laws and ordinances, promulgated for the sole purpose of securing as nearly as possible the full amount of taxes due the exchequer, Stuyvesant appointed inspectors, gaugers and revenue supervisors. Nevertheless, either on account of his natural distrustfulness or because he wished to set a good example to his officers, he frequently visited and inspected the taverns himself to make sure that his laws were obeyed. Money still being scarce, he increased the excise again and again, without permitting the brewers to raise the price of their product, until the beer-drinkers loudly complained that, with every increase of tax, the brewers made their beer "thinner and poorer." These complaints finally induced him to adjust the prices of beer in accordance with the increased cost of production, and to prescribe minutely the quality of the article. It may interest the reader to learn that beer, in those days, was made either of malted barley, wheat or oats, and that, whenever there was a scarcity of any of these cereals, the law-makers usually forbade the malting of it. Here, as in the New England colonies, the law provided for three grades of beer: the first grade requiring six bush-

GOVERNOR STUYVESANT INSPECTING TAVERNS.

els of malt for every hogshead; the second, four bushels; the third, two bushels. Complaints about the quality of beer were sometimes investigated by a court composed of the schepens and burgomasters. In 1655, when one of the burgomasters and two of the schepens were brewers, this Court, being engaged in the consideration of such a complaint, adjourned and personally sampled the beer in dispute; whereupon they gave judgment in accordance with their own evidence.

Before the administratlon of Stuyvesant, the Patroons regulated the liquor traffic in their own way. In Rensselaerwyck, the condition of affairs now became somewhat muddled, as will presently be shown, in consequence of the conflict of authority between the Patroon and the representatives of the Director of the Colony. The manner in which the Patroon first regulated the traffic was simple enough. As we have already stated, he established a brewery with the exclusive privilege of supplying all licensed retailers with beer; but he permitted private individuals to brew whatever beer they needed for their own families. Subsequently, however, other brewers were licensed. In the dorp (village) of Beverwyck—the present Albany—which had sprung up in the immediate neighborhood of Fort Orange, and, in fact, throughout the colony, permission to build houses, establish stores, factories, shops, beer-houses, &c., had to be obtained from the Commissaries to whom the

government was entrusted. This permission had to be paid for in some instances, while in others it was given gratuitously. As a rule, the license to brew beer for sale did not belong to the latter category; on the other hand, the fee for such license seems to have been very high. In 1647, Jean Labadie, formerly an assistant-commissary, applied for permission to build a brewery, which was granted on his paying a yearly duty, in the shape of beaver, amounting in value to about eighty dollars. Many other licenses had been granted since then, and the number of tapsters seems to have been very large; good reasons why the Court at Fort Orange, representing the Stuyvesant Government, should insist upon the payment of the tax. The Patroon, however, frustrated the first attempt to collect the excise and issued a proclamation expressly forbidding the brewers and tapsters to pay any duties. The tapsters, of course, readily obeyed this order. Finally, Stuyvesant ordered the Court at Orange to arrest one of the refractory tapsters, named Ariensen, and send him to Manhattan. The clerk of this court, Johann de Decker, successfully carried out this order by a ruse. He invited the unsuspecting Ariensen to his house and detained him, in spite of the protests of Van Rensselaer and the "schout" of the colony, and notwithstanding the offer of the former to vouch for the appearance of the prisoner. Ariensen, although compelled, for security's sake, to sleep in De Decker's bed, and being watched over by a servant, managed to escape and took refuge in the house of Van Rensselaer. De Decker pursued the fugitive with the intention of re-apprehending him, but was met by a body of armed men who appeared determined to use force of arms, if necessary, to prevent the officer from fulfilling

his duty. Bloodshed would inevitably have followed an attempt to recapture Ariensen; and, to avoid this, the officer retired, reporting the failure of his mission to the Director and asking that more soldiers be sent with him, having "among them one or two who are not nice about taking hold of a man." As was to be expected, Stuyvesant resorted to measures which soon rendered the Patroon amenable to law and order, and the revenues derived from tapsters alone rose, within one year, from an insignificant sum to 4,200 guilders, in 1657. Nothing noteworthy occurred thereafter during Dutch dominion.

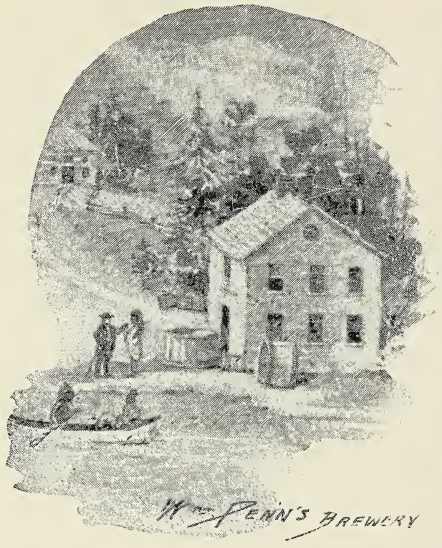
Nichols, the first English Governor of New Netherland, paid some attention to brewing. Among the laws which he submitted to the Assembly convened at Hempstead, and which are known as the Duke of York's Laws, was one providing that no person should be allowed to brew beer for sale without having "sufficient skill and knowledge in the art and mystery of brewing,"* and otherwise regulating the trade with a view to securing wholesome beverages. He also introduced the fee-feature into the license-system governing retailers. In his endeavor to conciliate the conquered Dutch burghers, he, however, refrained for a time from strictly enforcing this rule and other excise-regulations contemplated by his principal. It was not until 1670 that he gave peremptory orders for the collection of the excise.

From the date of the recovery of the Colony by the Dutch up to the second surrender to the English (1674), the liquor-traffic received but casual attention in New York; and for many years after the re-establishment of English supremacy, the annals of the colony contain no indications of great progress in brewing.

This also applies to the other colonies and settlements. In New Castle

* The first regular brew-master (in the modern sense of the word) was probably R. H. Vansoest, who came to Albany in 1635 to take charge of the Patroon's brewery.

BIERSTUBE IN HELL GATE BREWERY.



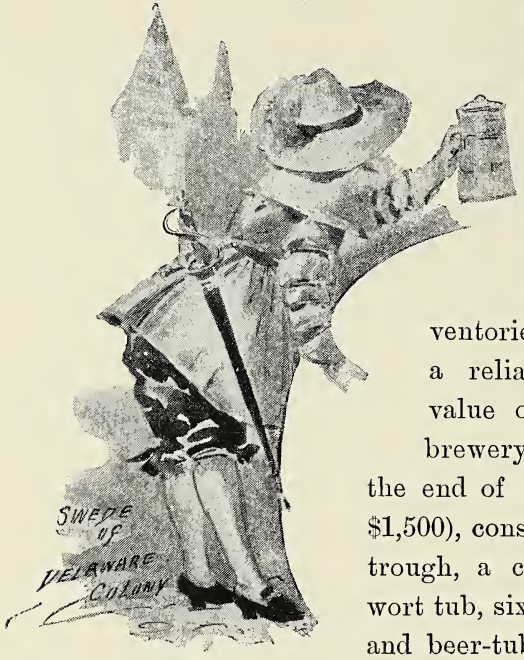
and Delaware River, the Duke of York's Laws remained in force until 1682, when they were superseded by the Acts passed by Penn's Assembly. William Penn introduced brewing into Pennsylvania at a very early date. He built a brewery near his house at Pennsbury, and all his acts and ordinances indicate a decided preference for malt liquors. It was under his fostering care that the "infant industry" prospered for a time and made Quaker beer quite famous. To the excellent quality of this beer and the abundance of it may be attributed the fact that brewing had not, at that time, gained a foothold in West New Jersey: the colonists there drawing their supply from the Quaker brewers in the adjoining colony. Deputy-Governor Gowen Laurie, one of the proprietors of West New Jersey, made an effort, in 1683, to have a brewer sent to him from England. A malt-house had already been established at Amboy, "but," wrote Laurie, "we want a brewer, and I wish thou wouldst send one to set up a brew-house." The Swedish settlements on the Delaware seem to have reaped a sufficient harvest from the vines which they had planted, to secure them an ample supply of wine.

In the Southern provinces, unfavorable soil and climate conspired with other unpropitious circumstances to exclude brewing almost entirely. Sporadic attempts to introduce it were quickly frustrated, no less by reason of a lack of suitable raw material than on account of a want of skilled brewers; and also, perhaps, because domestic spirits could be had more cheaply. In Virginia, as early as 1652, one George Fletcher had obtained the exclusive right to "brew in *wooden vessels*, which none had experience in but himself;" but his product evidently found little favor, for we read no more of him or his wooden vessels. The cheapness of rum militated not only against brewing but also against viticulture; and, finally, the drinking habits of the Southern people


SALZBURGERS FOLLOWING THEIR BEER

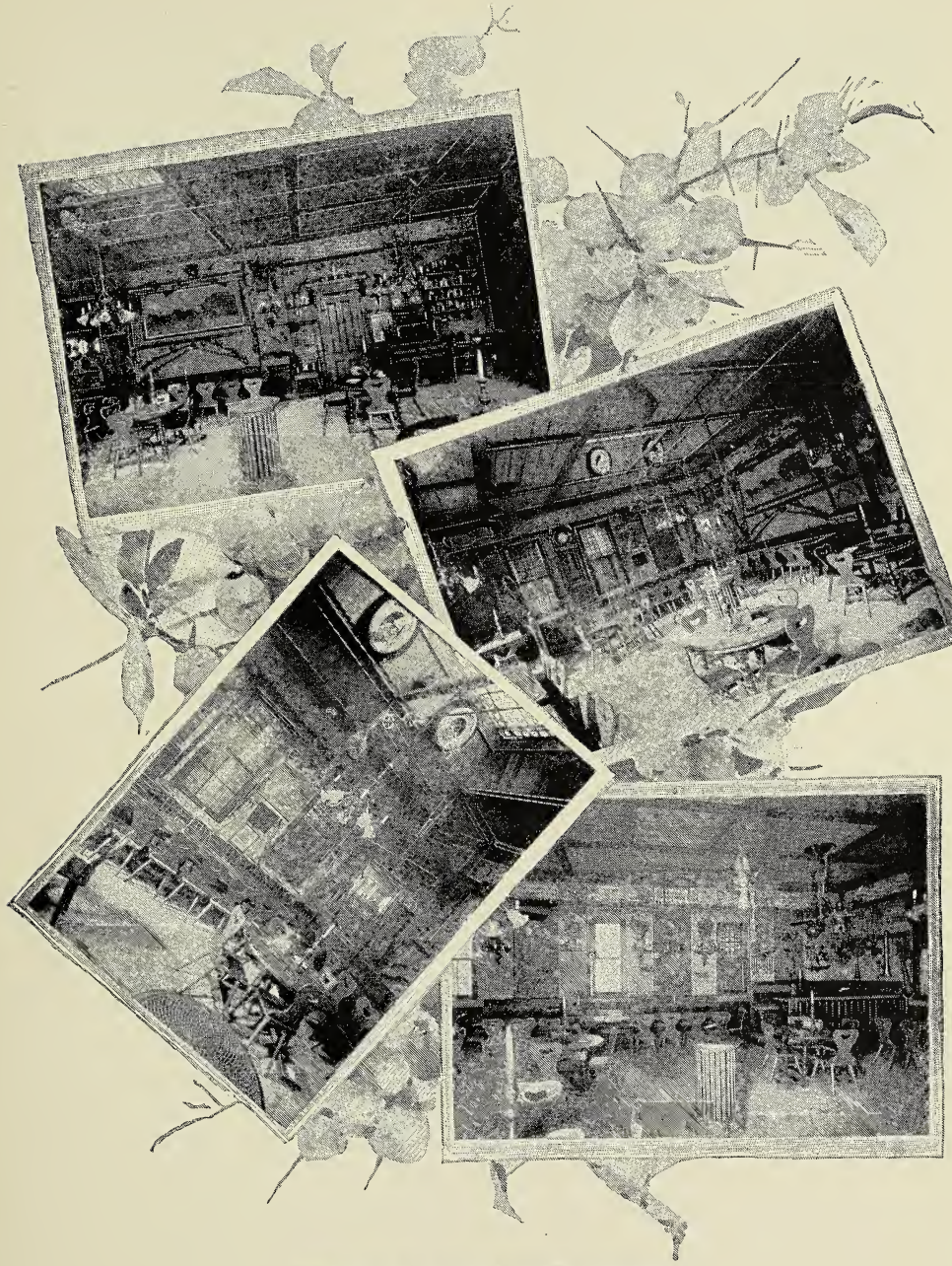
precluded the possibility of permanently establishing either. There is on record one noteworthy effort (of a much later date, it is true) to introduce brewing into Georgia, and it is all the more interesting, from a historical point of view, because an absolute prohibition of the sale of ardent spirits was—*very unwisely*, we believe—coupled with it. General Oglethorpe, who supervised, in part, the colonization of that province, induced the Trustees to prohibit distilled liquors in order to facilitate his attempt to introduce brewing. He exerted himself to the utmost in this endeavor and established a brewery at Jekyl from which he furnished a fairly good beer to the colonists ; but he finally failed for the same reasons which we have already stated. A local historian relates a very amusing incident which occurred on the journey of the Salzburgers to Fredericia. Mr. Oglethorpe accompanied them in his scout-boat, keeping the fleet together and taking one of the rafts in tow. As an incentive to unity of movement, he placed all the strong beer on board of one boat. The rest labored diligently to keep up ; for, if they were not all at the place of rendezvous each night, the tardy crew lost their rations of beer.

In the second century of the colonies' existence, brewing declined very rapidly, even in those localities in which it appeared, at the beginning, to be flourishing under the most favorable auspices. The trade with the West Indies, which brought cheap rum in exchange for lumber and other produce ; the marvellous development of domestic distilling, furthered by exceptional encouragements ; the ever-increasing demands made upon the brewers by the public exchequer—all these and other things conspired to reduce brewing to

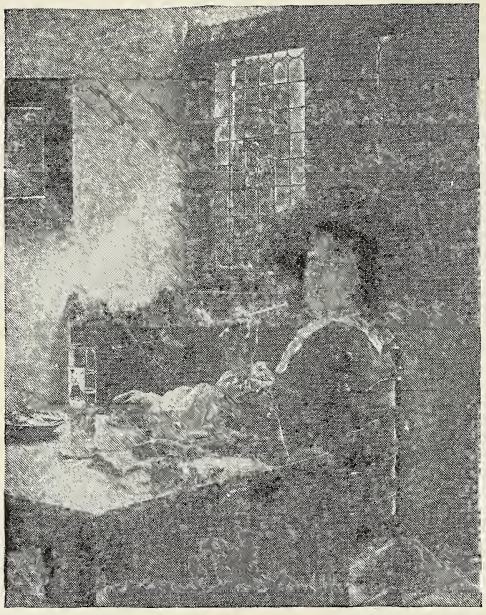


a pitiable state even in New York and Pennsylvania. The breweries which had before then been in operation were, with few exceptions, very small establishments, unable to withstand the joint pressure of high taxation and the competition of cheap spirits. We have before us a number of inventories of Colonial breweries and also a reliable indication of the monetary value of these plants. Thus, we find, the brewery of Pastoor (which was sold, towards the end of the seventeenth century, for about $1,500), consisted of building and lot; an under-trough, a cooler, a brew kettle, a wort kettle wort tub, six hogsheads, twenty-two half-barrels and beer-tubs *(bier vlooten)*, an iron vise, a little kettle, a wooden funnel, a brewer's sling, two gutters, a long and short gutter, and a scoop. Larger brew-houses than this existed at that time, of course, but the largest of them did not have the capacity of the very smallest brewery of our day. Little wonder, then, that they succumbed to so powerful a combination of adverse circumstances. There can be no doubt that the consumption of any article of food or drink depends upon its cheapness and the facility of obtaining it, and beer was dear and hard to get. The same causes also militated against viticulture, introduced very early, as we have seen, into the Swedish Colony on the Delaware river, under explicit instructions given to John Printz, governor of New Sweden, by Queen Christina.

Up to the revolution, the decline of brewing continued until scarcely a vague recollection of its former flourishing condition lingered in the minds of the people. Here and there, widely scattered over an immense extent of territory, a few brew-houses whose product had acquired an uncommon reputation —like the porters and ales of Philadelphia—remained in operation; but their output was infinitesimal as compared with the quantities of other inebriating liquors produced and consumed in the country. True, the law-makers im-



BIERSTUBE IN HELL GATE BREWERY.

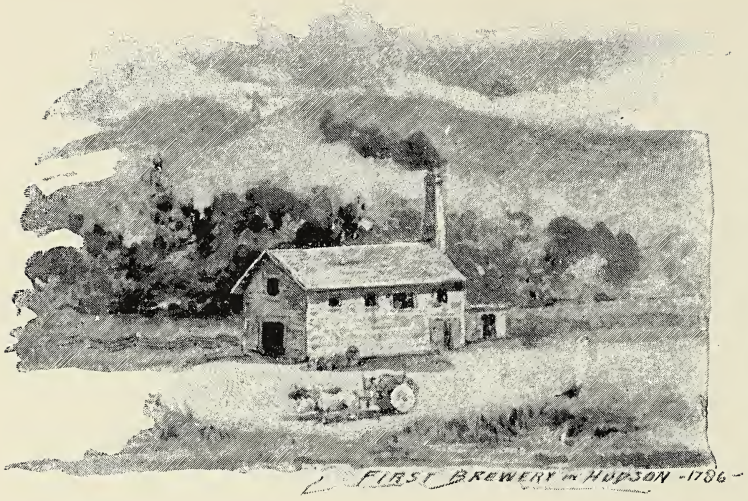


SOLITARY DRINKER.

proved every available opportunity to hold out inducements to brewers and never failed, on such occasions, to lament the total decay of the industry; but however allurring the exemption from duties and excises, premiums on domestic hops, and the protection of malt and beer may have been, they were insufficient to counterbalance other economic factors—such, for example, as the cheapness and popularity of rum, which the legislator could not neutralize. Hence, with the exceptions already adverted to, brewing relapsed into the primitive state in which we found it at the beginning of its colonial career, again becoming a domestic industry wherever a lingering taste for malt beverages induced the people to set up the discarded kettles, and to brew their own beer, from time to time. In like manner, tavern-keepers recommenced brewing in order to supply those of their customers who still preserved a taste for beer; and the quantities thus brewed for home consumption, in the narrowest sense of the term, may not have been inconsiderable; but we have no way of determining, even approximately, how large this production was. Such beers were not, of course, of a very good quality; and this explains the well-authenticated fact that, the few regular brewers who still continued to brew, were overrun with orders from the tapsters. Of a certain Quaker brewer it is reported that, toward the end of the eighteenth century, he used to hold receptions in the old Rainbow Inn, in Beekman Street, New York, whither came his customers, with hat in hand, to pay their respects and solicit a supply of ale! We should not be doing justice to our subject were we to omit mention of one

of the brewing tavern-keepers who during the Revolution distinguished himself, alike by the ardor of his patriotism and his undaunted courage and masterly generalship. We refer to General Israel Putnam, who, in addition to tilling his own lands, carried on the two-fold business of brewing and tapping until, obeying his country's call for brave hearts and stout hands, he joined the Revolutionary army, in which he won great honor and lasting fame. After the war, he returned to his old home in Brooklyn, Connecticut, resuming his old business and retaining control of it to the end of his days.

During the war, when commercial intercourse with England was completely shut off, and the importation of merchandise from other countries hampered by many dangers, domestic brewing revived in a measure; but the unsettled state of affairs prevented anything like a complete resuscitation of the trade. From all we can learn it appears that the increased activity in this field of labor was confined to an effort to produce the quantities of malt-liquors which before the war had been imported from England; but even this object was not, in all probability, fully accomplished, because other more pressing needs confronted the struggling people. For a short time after the re-establishment of peace, the slight impetus thus given to brewing derived an additional force from a pretty general movement in favor of malt-liquors, based alike upon moral considerations and economic requirements. We refer to the movement begun by Dr. Benjamin Rush, and carried forward by a strong organization for many years after its inauguration. It was during this period that many small breweries were erected in the towns along the Hudson in the State of New York, and in Pennsylvania. Our



vignette, from a drawing made for Mr. C. H. Evans presents one of the former, namely, the first brewery established in Hudson, N. Y. Philadelphia, where the movement referred to originated, at once became the greatest brewing city in America, the brew-houses there exceeding in number and the quantity of manufactured beer, those of all the sea-ports of the United States.

In every session of Congress for twenty years after the ratification of the Constitution, many forcible arguments were made in favor of malt liquors and so far as fiscal measures could tend to promote brewing, nothing was left undone; but popular dissatisfaction prevented the continuance of these agencies; and all other means resorted to for the purpose of reducing the consumption of ardent liquors only had the effect of mild palliatives.

The attempt to enforce the excise law aroused a spirit of open defiance in Western Pennsylvania, and led to a series of riots and violent disturbances, which finally culminated in the famous Whiskey Rebellion. Under the leadership of Tom the Tinker, a *nom de guerre* first suggested by one of the rioters of the name of Holcraft, the law-abiding farmers who showed a disposition to pay the excise (nearly every farmer had his own still in those days), were terrorized into submission and in a short time the whole of West Pennsylvania assumed an insurrectionary attitude. The excise officers were prevented, sometimes by threats, but more frequently by violent assaults, from performing their duty; collectors of excise were tarred and feathered and loyal citizens, who endeavored to rescue them, often paid with their lives

MALT SCALES AND MALT MILL IN HELL GATE BREWERY.

for their temerity. Revenue inspectors in different parts of the State were attacked in their own houses, and compelled at the muzzle of muskets, to surrender their commissions and to make solemn oath that they would publish their resignations in the newspapers, on pain of a repeated attack and the total demolition of their property. As this insurrectionary spirit had been fomented by some of the most prominent politicians, among them Gallatin, the Government had little hope of quelling the rebellion without force of arms; and this was finally resorted to, Washington himself reviewing the troops concentrated at Carlisle and directing their advance into the insurrectionary counties. Previous to this event, a number of skirmishes had taken place between the federal officers, supported by a handful of loyalists, and the rioters, and it was feared from the character of these fights that the military force would have a hard task to put down the rebellion, especially in view of the fact that no less than seven thousand men had gathered on Braddock's Field on the day of muster appointed by the rebel leaders. This fear proved groundless however, for at the approach of the troops, the insurgents, forsaken by their leaders, dispersed in great haste and returned to their homes. Thus ended the great Whiskey Rebellion. The excise-system which had caused it, remained in force for a number of years, and seems to have had the effect of restricting rural distilleries.

Change of administration brought a change of policy, and at the end of

the first decade of our century, rural distilling re-commenced with renewed vigor in all grain-producing States. The following table, showing the number of breweries and their production in 1809–10, is complied from official statistics.

States and Territories.	Population.	Number of Breweries.	Beer, Ale and Porter in Barrels of 31½ Gal.	Value
Massachusetts	700,745	....	22,400	$86,450
New York.....	959,049	42	66,896	340,766
New Jersey.....	245,562	6	2.170	17,229
Pennsylvania	810,091	48	71,263	376,072
Delaware.....	72,674	2	476	7,616
Maryland	380,546	7	9,330	69,380
Virginia.....	979,622	7	4,251	23,898
Ohio.....	230 760	13	1,116	5,712
Georgia	252,433	1	1,878	11,268
Districtof Columbia	24,023	3	2,900	17,400
	4.655 505	129	182690	$955,791

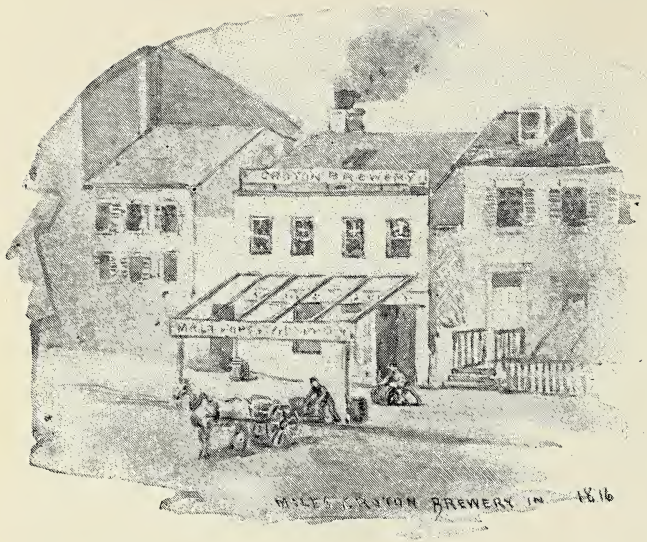
Although this table indicates a very considerable growth in the art of brewing, as compared with the state of the art during the half-century immediately preceding the Revolution, yet, compared with the production and importation of other beverages, the quantities stated above appear very small. Seven-eighths of the total production originated in but three States, viz., Pennsylvania, New York and Massachusetts, with an aggregate population of 2,469,885 inhabitants; and the greater portion of this quantity was undoubtedly consumed in those States, leaving but a small proportion for con-

sumption in the rest of the ten beer-producing States, and a still smaller in the remainder of the country. Dividing the quantities produced among the population of the States producing them, as shown in our table, we find that the *per capita* consumption amounted to 4.98 quarts. At the same time the consumption of ardent spirits amounted to 18.08 per capita. The question of exports and imports is left out of consideration in this statement, so far as malt liquors are concerned, because the two items counterbalance each other, the quantities exported and imported, in 1810, being 90,550, and 93,458 gallons, respectively. From this time onward the brewing industry developed somewhat more rapidly in Pennsylvania and New York on account of the great influx of immigrants from beer countries; while in the other States it either remained stationary or progressed very slowly, constantly struggling against great difficulties and impediments. The extent of the progress of brewing within forty years, *i. e.* from 1810 to 1850, is clearly stated in these figures:

1810 : 129 Breweries producing	.....	5,754,737	gals.	of beer.
1850 : 431 " "	.....	23,267,730	"	" "
1850 : Production of beer in Penn. and New York	....	18,825,096	"	" "
1850 : " " " all other States	.....	4,442,634	"	" "

During all this time, and up to 1842, or thereabout, the beers produced in this country were of the kind known as ale and porter, and some of these had

MASH TUNS IN HELL GATE BREWERY.



acquired a reputation for palatableness and strength which rendered them formidable competitors of English ales in foreign markets. It is a somewhat remarkable fact, that but very few of the ale breweries established or in operation at the beginning of our century, are still held by the descendants of their founders. One of the few is the Croton Brewery of the Miles family, which establishment at present covers almost half of one block, while in 1816 it was what our vignette shows. There are but few instances in which the brewing establishments remained in the same family for more than four generations; from present indications it appears, however, that in the future this will be changed.

LAGER-BEER, as a product of American industry, although introduced as has been intimated, about the year 1842, did not gain popular favor until the decade following its introduction; nevertheless, all authorities agree that it added materially to the increase of production shown in the preceding table. As to the exact date of its introduction, and the person by whom it was first introduced, there still exists so much uncertainty that no writer on the subject has ventured to go beyond mere hypothetical assertions. Did we not live in an enlightened age, the mystery in which the origin of American lager-beer is shrouded might, add another legend to the many mythical tales

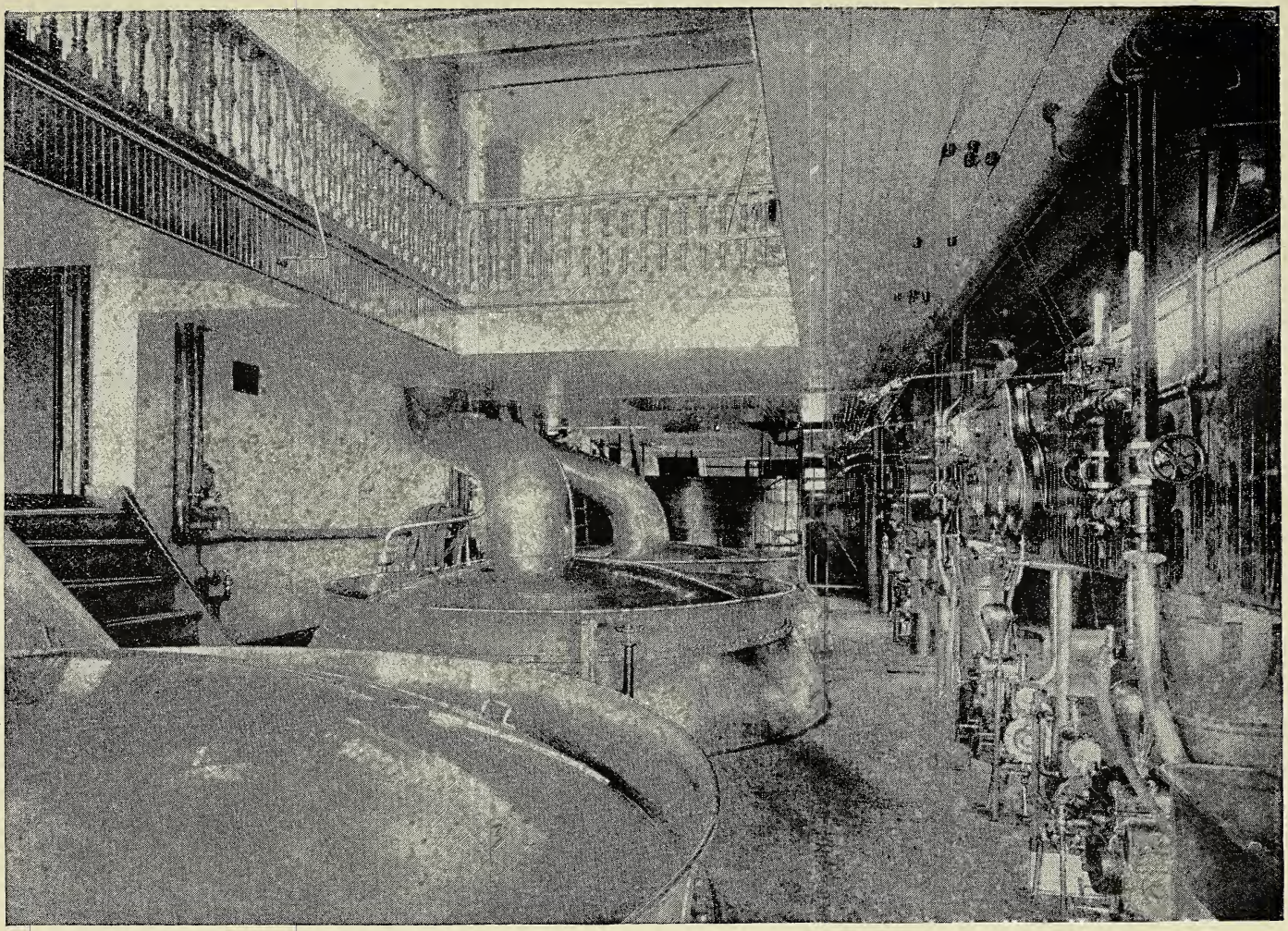
which, variously colored by different nations, are current concerning the father of *real* beer. We say *real* beer, for, although the use of a wine-like beverage, extracted from barley, extends far into the pre-historic ages, real beer (that is, the drink known to us by that name) is of more recent origin; yet, as to place and date of the latter, nothing definite can be known. While some attribute the invention of hopped malt-beer to Jan Primus (John I), a scion of the stock of Burgundy princes, who lived about the year 1251, others ascribe it to *Jean Sans Peur* (1371-1419), otherwise known as Ganbrivius. A corruption of either name may plausibly be shown to have resulted in the present name of the King of Beer, viz., Gambrinus, whom we are accustomed to see represented in the habit of a knight of the middle-ages, with the occasional addition of a crown. Popular imagination, it seems, attached such great importance to beer, that in according the honor of its invention, it could not be satisfied with anything less than a king; just as the Egyptians, in remote antiquity, ascribed the invention of their barley-drink to their benevolent god Osiris; while the ancient Germans conceived of a brew-house in Walhalla, under the supervision of a presiding deity. As a bit of amusing anachronism it may be mentioned that there is a poetical apotheosis of Gambrinus, which elevates that personage to the dignity of a heathen god, alongside of Bacchus.

This slight digression from our subject, although showing how much

STATUE OF LAUER.

mystery has at all times clouded the origin and originator of beer, may not be regarded by our readers as a sufficient excuse for our inability to be more accurate concerning the beginning of American lager-beer; but, much as we may regret this, we cannot help it. According to the testimony of the late Mr. Lauer, who himself brewed lager-beer in 1844, the honor of having first brewed the famous drink of to-day, belongs to one Wagner, of whom it is said, that, shortly after his arrival in America, in 1842, he set up a lager-beer brewery in a small building situated in the suburbs of Philadelphia. Lauer enjoyed the reputation of a walking encyclopedia of American brewing; as a matter of fact, he took a prominent part in organizing the National Brewers' Association, and bringing about concerted action by the brewers in all matters relating to their trade, and kept himself well posted in all that concerned his colleagues. In 1885, a few years after his demise, the United States Brewers' Association, of which Mr. Ehret was then a Trustee, erected a monument to his memory in a public square of Reading, Pa., the city in which he had spent the greater part of his life. If lager-beer had been introduced before the date here given, Lauer certainly would have known it.

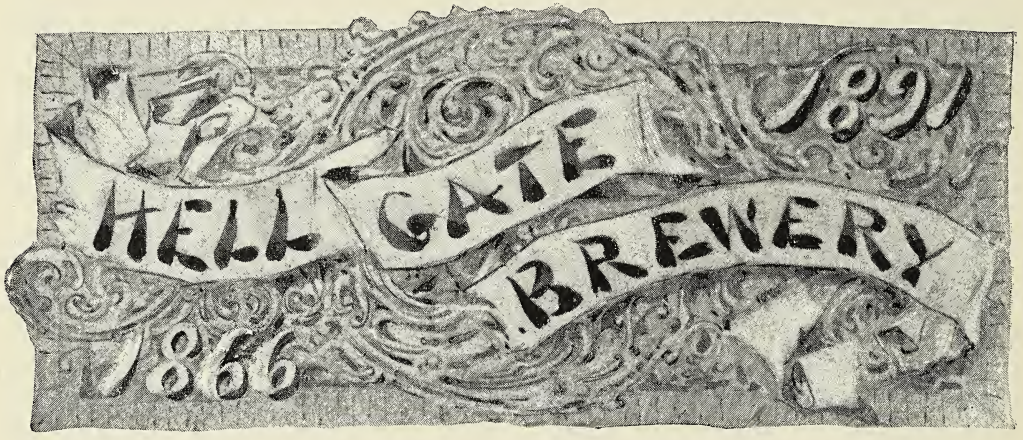
We may take it for granted, then, on Lauer's authority, that lager-beer was introduced in 1842. Within six years from that date, German emigration began to assume unprecedented proportions; the hospitable shores of our country became the refuge of a great number of highly educated men, of skilled artisans and comparatively well-to-do tradesmen. The total foreign population increased from 1850 to 1860 at the rate of ninety per cent., and we may infer from the following figures to what extent



BREW KETTLE ROOM IN HELL GATE BREWERY.

this great influx of beer-drinking people accelerated the growth of brewing, and helped to increase the production of hops and barley:

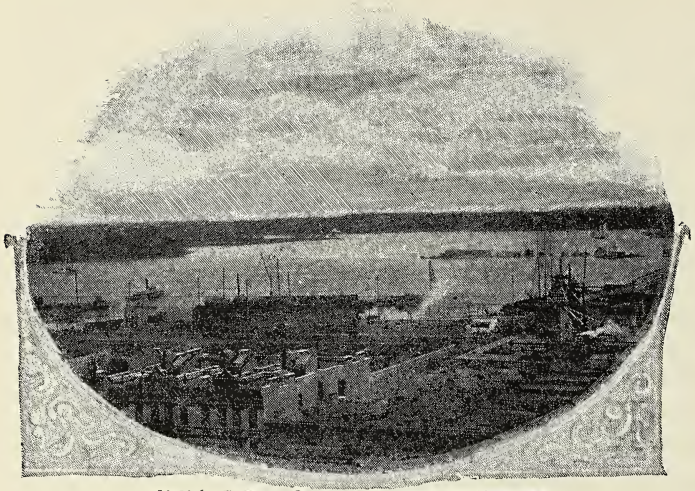
	Population.	Production of Hops. Pounds.	Production of Barley, Bushels.	Number of Brewers.	Value of Malt Liquors.
1850.	23,191,876	3,497,029	5,167,015	431	$5,728,568
1860.	31,443,321	10,991,996	15,825,890	1,269	21,310,933



Hell Gate Brewery was established by Mr. George Ehret in the year 1866; hence, at a time when the annual production of malt liquors had increased to 5,115,140 barrels. He had then just attained the age of thirty-one years, the date of his birth being April 6th, 1835. Nine years before the establishment of this brewery, Mr. Ehret came to America (1857) to join his father, who had emigrated from Germany in August, 1852. That was the time when entire households from the rural districts, as well as from the cities of Germany, sold their lands or business to seek new homes on this side of the Atlantic, attracted hither no less by the glorious political institutions of our country, than by the alluring prospects of greater prosperity, constantly brought before their minds by the glowing descriptions of those who had preceded

them and found their expectations outdone by reality. The best authorities on immigration agree that at no time during the life of our Nation did we draw a more desirable and useful army of workers from over-crowded Europe, than during the period after the "rebellion" of '48. The Germans who came during and after that period were mostly beer-drinkers, and the demand for that mild beverage soon became so great that the speedy erection of additional breweries proved to be a manifest want. Those who were then engaged in brewing, far from fearing competition, deemed it a wise policy to encourage new ventures; in many instances they assisted new beginners, and particularly those who had once been in their employ. In doing so, they gave proof not only of their foresight, but also of that brotherly feeling which has always been, and is to this day, one of the characteristics of the brewing fraternity. Mr. Ehret, being a thoroughly practical brewer, strictly devoted to his calling, had not long to serve in the brewery of Mr. A. Hüpfel, before he rose to the foremanship and gained the full confidence of his employer and friend. When he made known his intention to start a brewery for himself, this Mr. Hüpfel—a man of generous instincts and philanthropical disposition,—at once prommised and, at the proper time, gave his support and assistance to the new enterprise.

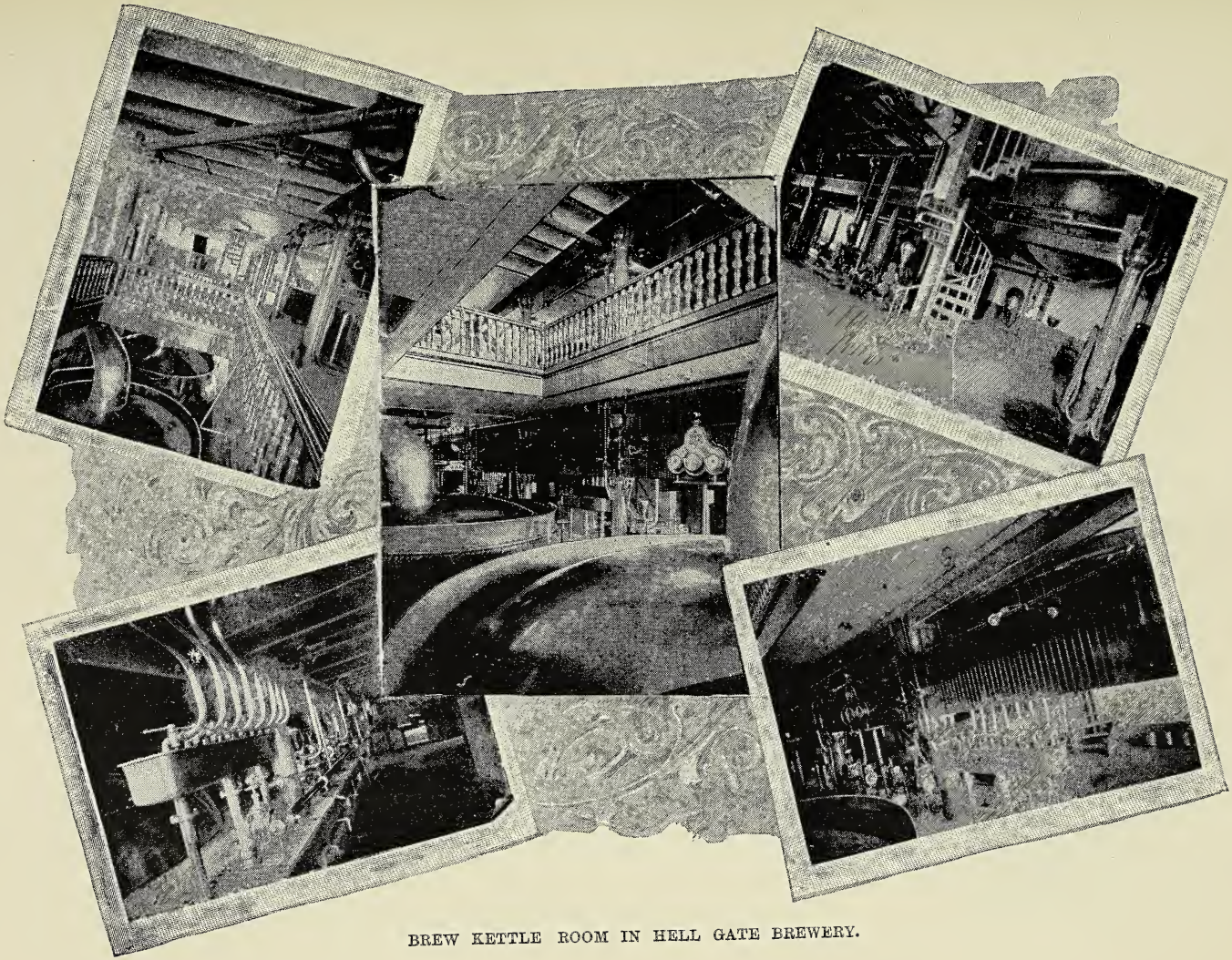
The site selected by Mr. Ehret for his brewery was at that time of a decidedly rural character; the scarcity of human habitations harmonized fully with the prevalence of bucolic detail; and if we add to this the beau-



HELL GATE FROM NEW-YORK SHORE

tiful view of the river, which was then to be had from any point of the little *plateau*, one may well conceive, without overstraining one's imagination, that of all the picturesque points around the great city, this may have been the favorite haunt of poets intent upon pastoral inspirations. The character of the houses in the neighborhood was in keeping with the entire surroundings, and the only dwelling of any architectural pretensions was the Fanshaw Mansion, at present the home of a prosperous club. Although in colonial days this spot was almost one continuous stretch of virgin wilderness, it is, nevertheless, mentioned quite frequently in all old descriptions of Manhattan Island, mainly on account of the perils which navigators encountered when passing the rock-studded strait between the opposite shore and the little river islands; a dangerous passage, indeed, and one which gave rise to the significant but totally inapplicable designation of Hell Gate. Inapplicable, because that name, if taken literally, would mean that the strait is a sort of portal to *sheol*, and surely, such an impression was not intended to be conveyed by the early voyagers who described the land, both above and below the dreaded spot, as a perfect paradise. We find one of the earlier descriptions of Hell Gate in Danker's Voyage to New York, in 1679-80. Here it is:

"The river then runs northerly to Hell Gate, where there is an island, in front of which on the south side are two rocks, covered at high water, and close to the island, besides others which can easily be seen. Hell Gate is nothing more than a bend in the river which, coming up north, turns thence straight to the east. It is narrow here, and in the middle of the bend or elbow, lie several large rocks. On either side it is wider, consequently



BREW KETTLE ROOM IN HELL GATE BREWERY.

the current is much stronger in the narrow part; and as it is a bend, the water is checked, and made to eddy, and then striking these rocks, it must make its way to one side or the other, or both; but it cannot make its way to both, because it is a crooked bay, and, therefore, it pursues its course until it is stopped on the opposite side of the bay to which it is driven, so much more because it encounters these rocks on the way. Now, between the rocks there is no current and behind them it is still; and as the current for the most part is forced from one side, it finds liberty behind these rocks, where it makes a whirlpool. You must, therefore, be careful not to approach this whirlpool, especially with small vessels, as you will be in danger of being drawn under. It makes such a whirlpit and whistling that you can hear it for a quarter of an hour's distance, but this is when the tide is ebbing, and mostly when it is running the strongest."

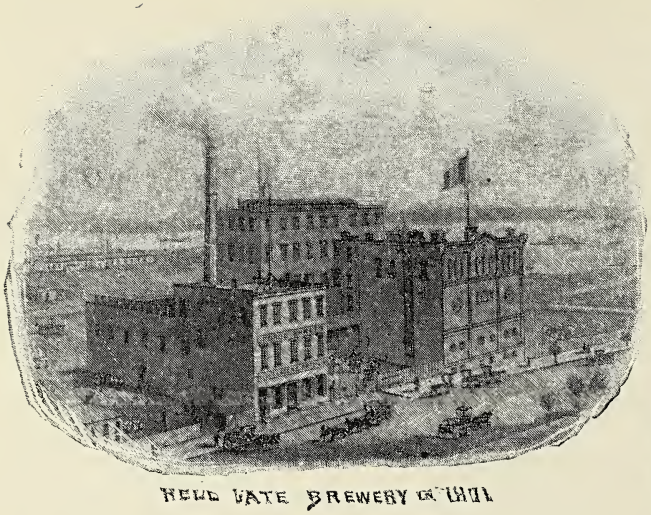
In colonial days, a few bouweries (farms) were cultivated on the Long Island shore in the neighborhood of Hell Gate, and on one of these, which belonged to Peter Cornelissen, the Indians killed three men. The locality is often mentioned in old documents, as we have said, but only in a casual way in connection with surveys, the arrival of ships, and such unimportant events. There are on record, however, two propositions to fortify Hell Gate, with a view to preventing the passage of ships in times of war. The one was submitted by Colonel Slaughter to the Lords of Trade; the other is included in a comprehensive plan of harbor defences, drawn by Colonel Roemer, at the request of Lord Bellomont, in the year 1700. Roemer proposed the erection of an enclosed battery of 12 or 13 guns at the narrowest part of Hell Gate.

In the eyes of the lover of lobster-salad, Hell Gate may derive additional interest from a somewhat apocryphal anecdote to the effect that there were no lobsters in New York harbor and adjacent waters, until an Eastern boat, freighted with tanks full of live lobsters, foundered on the rocks, setting free the captive shell-fish. In recent times Hell Gate achieved world-

wide fame on account of the engineering skill by which the obstructions were removed from the river. It was a gigantic work which is still fresh in the minds of most readers, and, therefore, needs no description.

The building in which Mr. Ehret began brewing, was erected under his supervision on the lower part of the block between 92d and 93d streets, and second and third avenues, and its interior appointments were completed and ready for operation at the beginning of the year 1867. This building is no longer standing, it was succeeded by another in 1871, which forms the nucleus of the immense establishment that now covers the greater part of an entire block. It is at present almost hidden by the over-towering brewery buildings, which have sprung up around it in the course of a quarter-century, and a full view of it can only be gained from the quadrangular yard, of which it forms the interior side, the buildings flanking it being the offices and the storehouse, both fronting on 92d street.

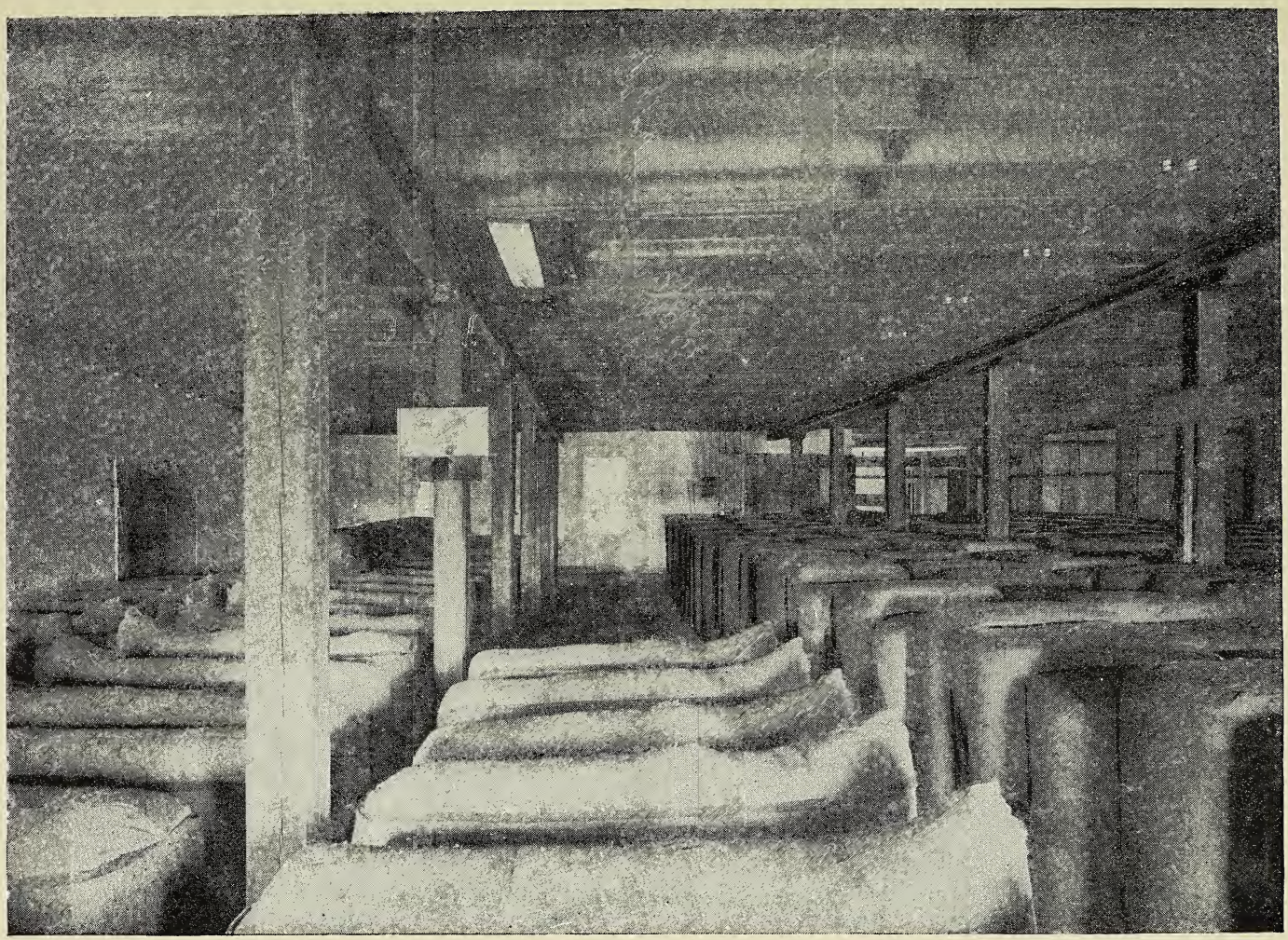
Compared with its present-day development, the art of brewing may be said to have been in a somewhat primitive condition in the days when Mr. Ehret began his enterprise. The almost innumerable modern inventions and appliances, which make the breweries of our day perfect marvels of scientific ingenuity and mechanical skill, are nearly all achievements of comparatively recent origin, and, hence, the brew-master of twenty-five years ago had to do without them. Of course, the principles of brewing remain unchanged; but the *modus operandi* has become so thoroughly methodized and the scientific auxiliaries, which the brewer may call to his aid, have grown so numerous,



NEUE VATE BREWERY OF 1871

that the task of the brewmaster is now much less onerous than formerly, and not as dependent upon individual skill and personal experience as it used to be. In all progressive industries the skilled artisan now requires greater scientific training, but less self-reliance, than formerly. It is well to bear this fact in mind, as it explains in a measure the success of all those breweries which were established by practical brewers of the old school, and whose products were known for certain special qualities peculiar to them, and differing from most others.

Mr. Ehret from the very beginning aimed at the brewing of a beer as nearly like the best quality of Munich lager, as the difference between our water and that of the river Isar would admit. How well he succeeded in this, may be inferred from the astonishing popularity which his beer attained to in a few years. As has been said, he began brewing immediately after the completion of his plant. At the beginning of January, 1867, the first brew was stored in the cellars; in March of the same year his wagons, freighted not only with kegs, but also, metaphorically speaking, with all his expectations and anxieties, left his yards for the first time to serve his new customers. Five years after that date he sold 33,512 barrels; seven years later, 74,497 barrels, and in 1874 he produced and sold 101,050 barrels—a quantity which sixteen years ago was manufactured by but very few of the largest establishments. This unprecedented growth was then all the more remarkable, because Mr. Ehret's operations had suddenly been checked for a considerable time on account of a fire which, on the 19th of September, 1870, destroyed the greater part of his brewery, including books and papers. It is owing to this accident that we are unable to give the quantities of beer brewed during



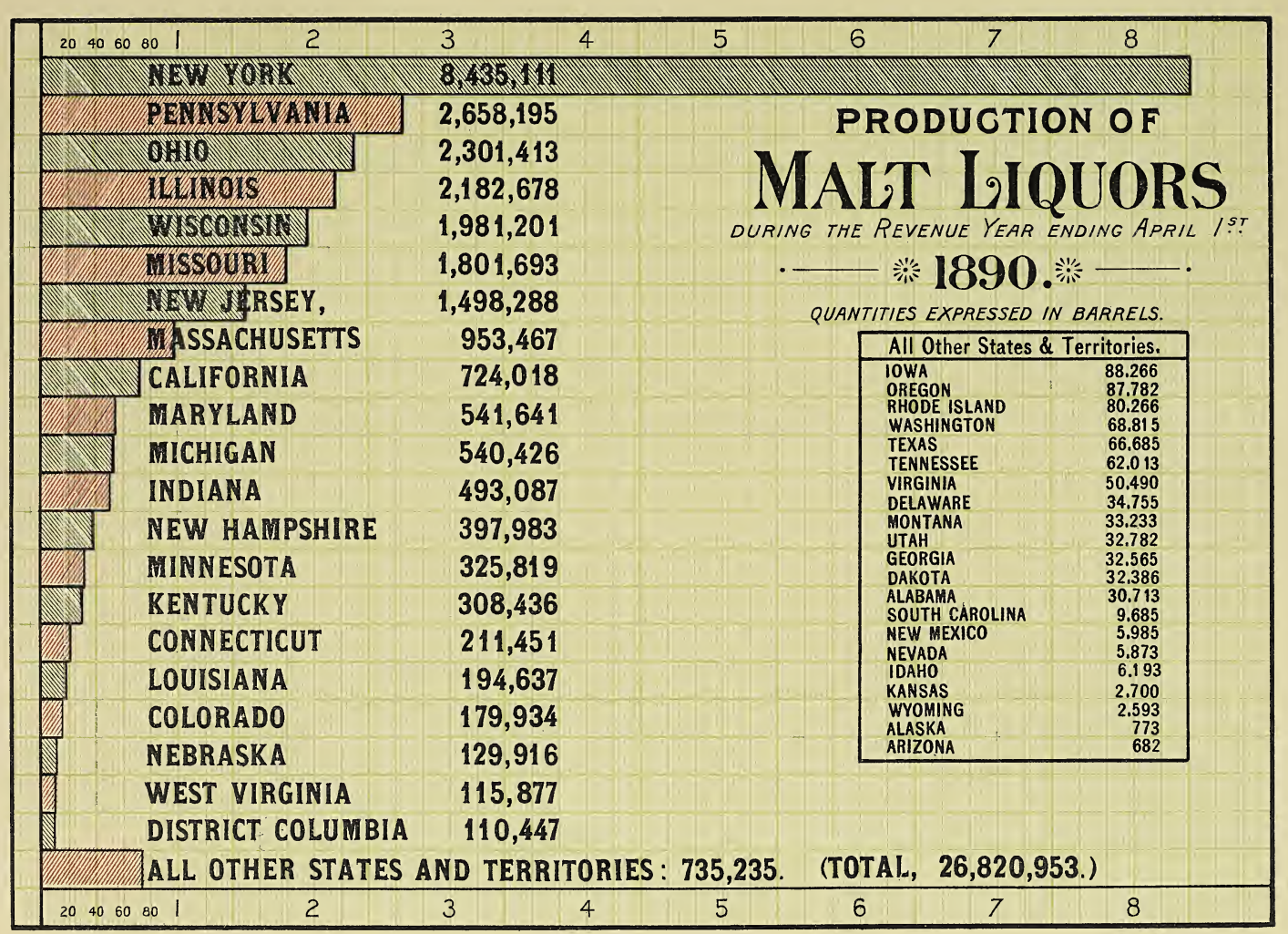
STORE ROOM FOR HOPS IN HELL GATE BREWERY.

the four years preceding the fire.

The year 1870 may be called the second starting point in the growth of Hell Gate Brewery. In a certain sense the fire was not an unmixed evil, especially in view of the fact that the demand for Ehret beer was fast outgrowing the capacity of the original plant, necessitating a considerable extension of the premises and buildings, and many additions to the machinery and other appointments.

Before proceeding to a description of the establishment, it may be proper to review, retrospectively, the progress of American brewing in general, as compared with that of the Ehret's brewery. In doing so, we shall exclude the period preceding the fire, thus confining our review to twenty years, beginning in 1871 and ending in 1890 :

	PRODUCTION OF MALT LIQUORS IN THE UNITED STATES.	PRODUCTION OF BEER IN EHRET'S BREWERY.
1871	7,740,260	33,512
1872	8,659,427	56,020
1873	9,633,323	74,497
1874	9,600,897	101,050
1875	9,452,697	129,989
1876	9,902,352	134,050
1877	9,810,060	157,825
1878	10,241,471	172,810
1879	11,103,084	195,216
1880	13,347,111	220,096
1881	14,311,028	236,082
1882	16,952,085	263,755
1883	17,757,892	273,182
1884	18,998,619	280,595
1885	19,185,953	292,899
1886	20,710,933	311,342
1887	23,121,526	367,732
1888	24,680,219	375,254
1889	25,119,853	396,568
1890	26,820,953	412,851



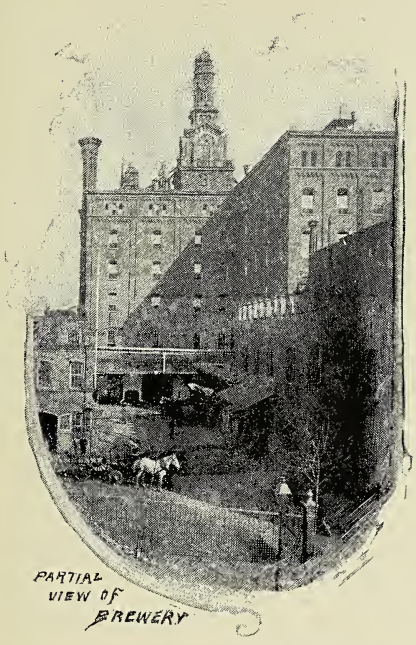
PRODUCTION OF MALT LIQUORS

DURING THE REVENUE YEAR ENDING APRIL 1ST

1890.

QUANTITIES EXPRESSED IN BARRELS.

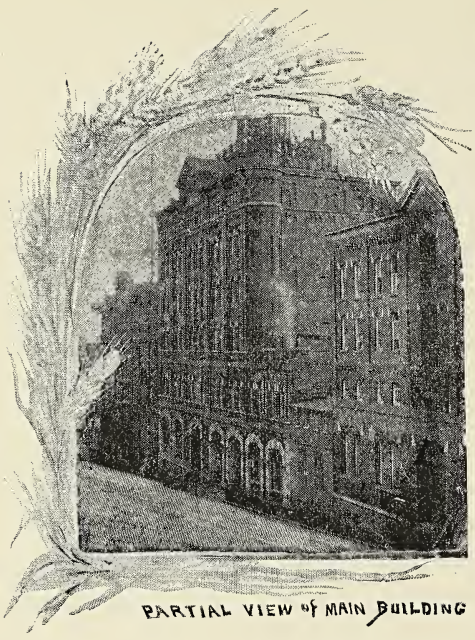
All Other States & Territories.	
IOWA	88.266
OREGON	87,782
RHODE ISLAND	80.266
WASHINGTON	68.815
TEXAS	66.685
TENNESSEE	62.013
VIRGINIA	50.490
DELAWARE	34,755
MONTANA	33.233
UTAH	32.782
GEORGIA	32.565
DAKOTA	32.386
ALABAMA	30.713
SOUTH CAROLINA	9.685
NEW MEXICO	5.985
NEVADA	5.873
IDAHO	6.193
KANSAS	2.700
WYOMING	2.593
ALASKA	773
ARIZONA	682



It will be seen at a glance that the rate of increase in Hell Gate Brewery exceeds the rate of the general increase throughout the Union in a proportion of about 13 to 3½. In other words, while the production of beer in the United States, in 1890, was not quite three and a half times greater than in 1871, the production of beer in Hell Gate Brewery, in 1890, was over twelve times greater than in 1871.

Our statistical diagram on the next page shows the production of beer, in 1890 by States; it also shows that the State of New York leads all the other States in the production of beer, being ahead of the State which ranks next to it (Pennsylvania), by over five and a half million barrels. In this, the greatest beer-producing State of the Union, Hell Gate Brewery stands first on the list in point of quantity produced, its output for 1890 being, as we have shown, 412,851 barrels. The brewery which occupies second place in New York produced, in 1890, about 100,000 barrels less than Mr. Ehret's brewery. The rapid increase of production, throughout the country, began shortly after the introduction of the Internal Revenue system, during the last years of the War of the Rebellion. The brewers themselves helped the government in perfecting the mode of collecting the internal tax, being prompted no less by patriotic motives, than by a desire to obtain a practicable system. Mr. Ehret began brewing at a time when the rapid advance of brewing had begun, but he soon forged ahead at an unusual pace.

His immense production has been attained to without any forced efforts to open new channels outside of the limits of the State of New York; although, naturally enough, whenever a demand was shown to exist in outside markets, Mr. Ehret endeavored to supply it, and thus established a number of agencies. The home demand always proved so great, that the idea of engaging in an extensive export trade beyond the sea could not be enter-



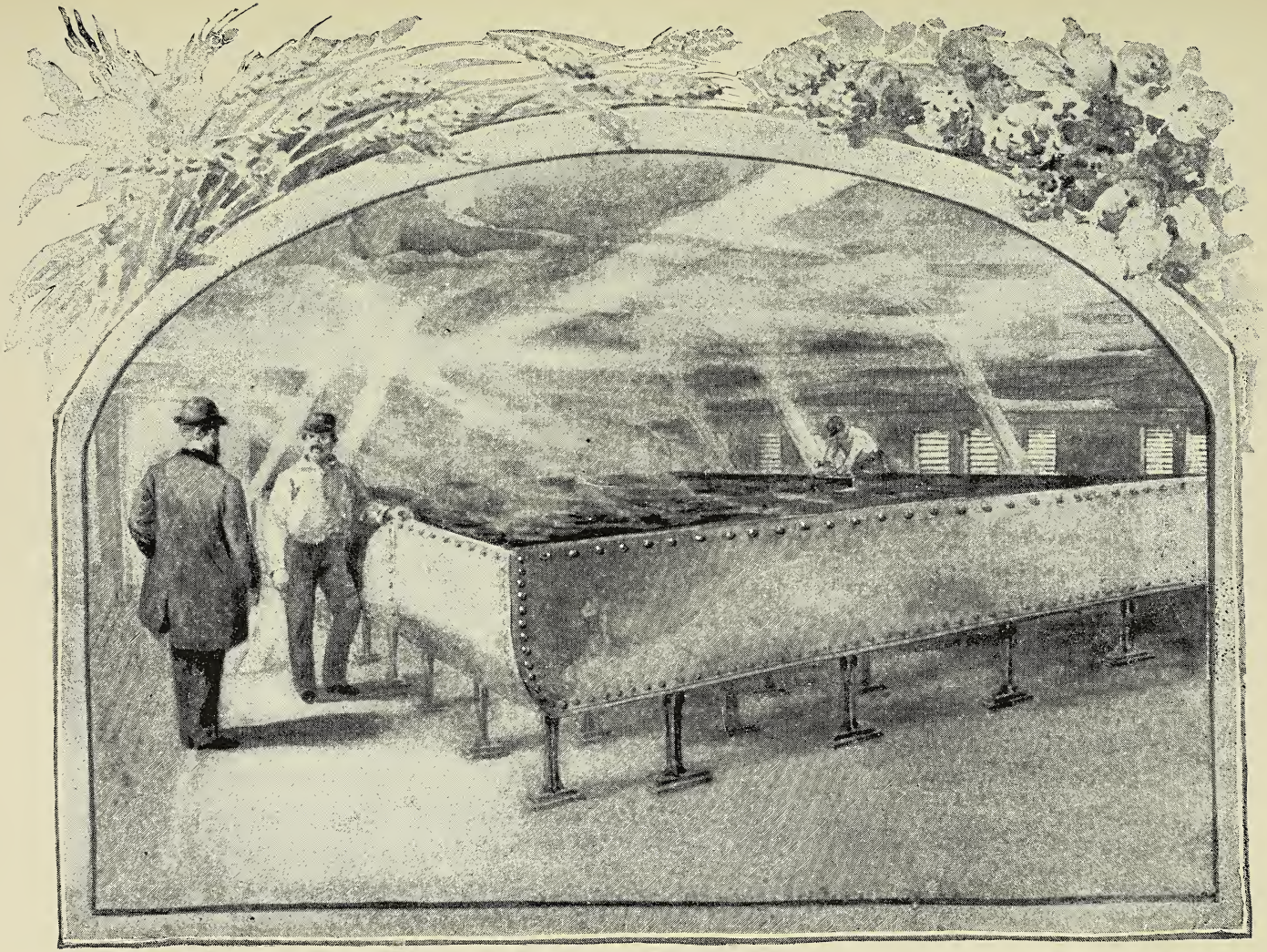
PARTIAL VIEW of MAIN BUILDING

tained, save in conjunction with plans for a further enlargement of the establishment.

We shall presently return to this question of production and consumption of malt-liquors in the United States and elsewhere, in connection with other matters of interest, and, therefore, leave the subject now in order to relate in detail the impressions which Hell Gate Brewery left upon the mind of a recent visitor, who studies with keen interest the progress of brewing and kindred industries. His object is to convey to the mind of the reader his observations, without varnish or embellishment.

ON approaching the brewery, one is impressed at the very first glance with the unusually large dimensions of the grounds upon which the buildings are erected. In a smaller city this would not be anything worthy of note, but in New York, and especially in that part of it to which we refer, where scantness of territory and an immense and ever-growing population render necessary the utmost economy in the utilization of space (much to the detriment of architectural beauty), such extended premises as those we speak of, cannot fail to make an impression. The grounds, extending from within a short distance of Third Avenue to Second Avenue, and from 91st to 94th Streets, comprise, inclusive of stables and storage buildings on Second Avenue between 91st and 92nd Streets, seventy-five city lots, or one hundred and eighty-seven thousand five hundred square feet.

The main building, an imposing structure surmounted by a graceful clock tower, fronts on 93d Street, extending southward to a considerable depth; it is flanked on either side by lower wings, which in point of architec-

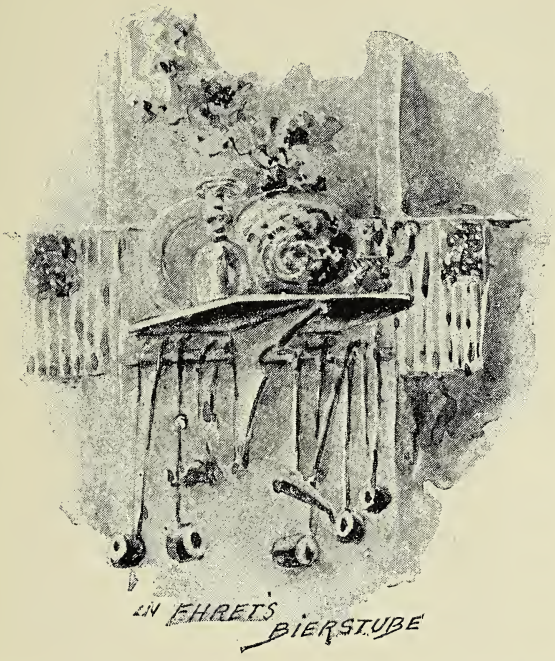


COOLING TANK IN HELL GATE BREWERY.

ture and symmetrical proportions, harmonize perfectly with the principal façade. Ornamental gables, rising from the cornices of every building, enhance the impression of uniformity which, next to utility, was manifestly one of the prime objects of the architect. Seen from 92nd Street the main building presents the shape of an L, by reason of a rectangular extension, as shown in our illustration on page 13. The buildings fronting on 92nd Street are the offices and stables; the spaces between these buildings are enclosed and, together with the rectangular extension of the main building, form two spacious yards, portions of which are covered and arranged in such a way as to serve the purpose of wagon-sheds. Our two full-page illustrations of the front and rear views of the buildings, pages 9 and 13, give a fair idea of the whole establishment.

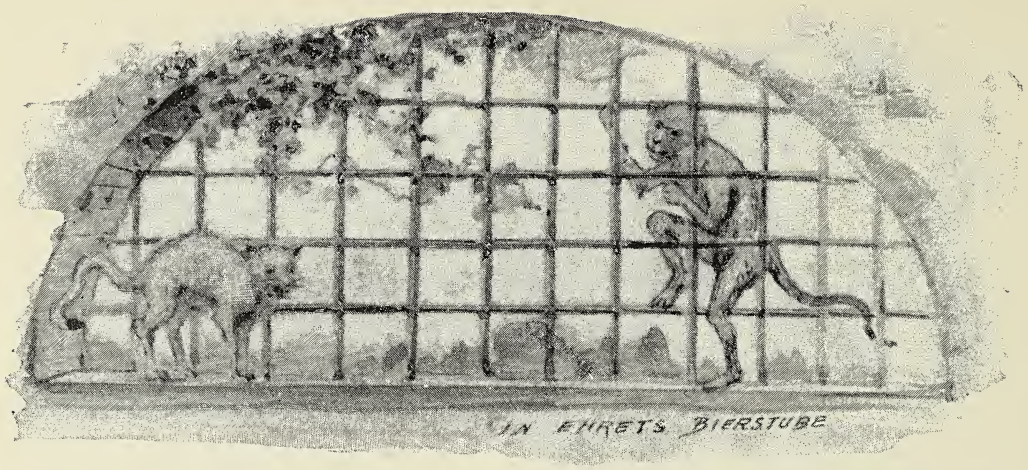
A visitor will naturally enter the establishment by way of the office where, after passing through a large room with four rows of desks of half the width of the building, he will find a small private waiting room from which stairs lead to the upper floors. These floors are divided into a number of offices for bookkeepers and correspondents, and a private office, comfortably fitted up, in which the proprietor or his representatives dispose of affairs not directly connected with the daly supply of retailers.

The force of professional assistants, bookkeepers, correspondents and clerks is quite numerous, so large, in fact, that a division of the labor, in such a manner as to provide separate departments, has become a necessity. Each of these departments is subordinate to a chief upon whom rests the responsi-



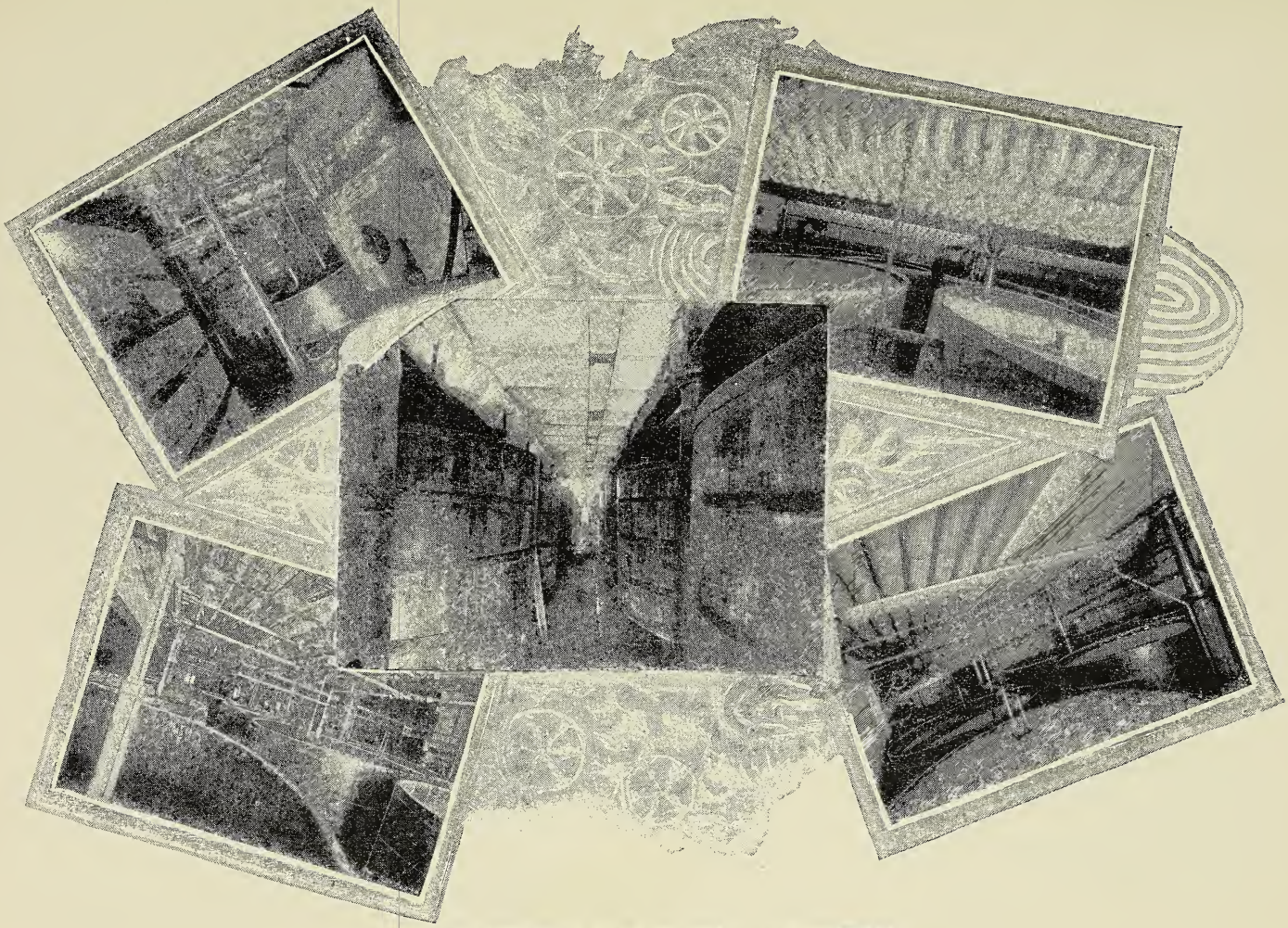
bility for the prompt execution of the work assigned to him, and who renders an account to the proprietor or his representatives in all matters belonging to his division. In this manner the office-work has been so thoroughly systematized that a complete survey of the industrial and financial operations of the brewery may be had at the shortest notice. The principal matters to be attended to by this force are the accounts with dealers in raw material; the dealings with retailers; the revenue account, quite an important item; the observation of the many revenue laws relating to brewing; inventory of stock, utensils, machinery, material, &c.; correspondence with customers, and many similar affairs. There is, in addition to this, a force of intermediary agents who are in daily attendance at the office, during certain hours. When occasion requires, they visit customers and attend to other outside work. (See illustration on page 17.)

From the second floor of this building a spacious corridor leads to what visitors and guests are apt to consider the most interesting part of the brewery, namely, the "Bierstube," or, literally translated, beer-room. Hospitality is a virtue which every brewer seems to practice as if it were a duty from which no departure can be tolerated. The custom of entertaining all visitors, though they be entire strangers, and that other good usage of furnishing free beer to brewery employés appear to have been introduced by the brewing monks of the middle-ages, when nearly every monastery was a "hospitium," a place of entertainment for the "hospes" (strangers), from which Latin word our term hospitality is derived. At all events, whatever their origin, these customs are to this day scrupulously observed in every American

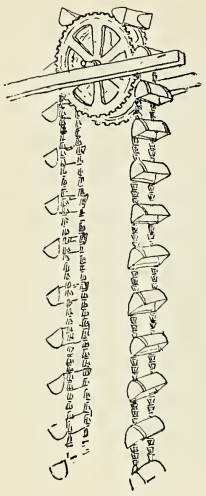


brewery, and if there is not in every one of them a "Bierstube," separately fitted up for guests, there surely is in all of them a *Sternewirth*, where beer is served to employés and visitors.

The *Bierstube* in Hell Gate Brewery is what Frenchmen would style a *bijou;* a very large square room decorated and furnished in genuine old German fashion, filled with quaint cabinets, high-backed chairs and solid oaken tables, crudely carved and ornamented with antique drinking vessels, and many rare objects of great interest, for which an antiquarian might envy their possessor. The walls are covered with suggestive paintings, on which falls a warm light, softened by multi-colored panes of glass in the roof and walls. Many verses apostrophizing the drinker, or relating to beer, beer-making, malt, hops, drinking-customs and the like, are distributed all over the room, usually on scrolls underneath pictures, or placed so as to fill up artistically the interstices between the mural decorations. Everything tends to render the visitor reluctant to leave the place, and this evidently is the impression which the host intends to make upon his visitor; in fact, a verse on one of the walls says as much. But we will not tarry here too long, especially since our illustrator insists, with true artistic instinct, that we must leave the field to him, as he believes, and we coincide with him, that here the brush will serve the reader better than the pen. Adjoining this room is another, less spacious, in which a tapster is constantly at work, ever ready to anticipate, and eager to fulfill any thirsty guest's wishes.



FERMENTATION ROOM IN HELL GATE BREWERY.



MALT ELEVATOR

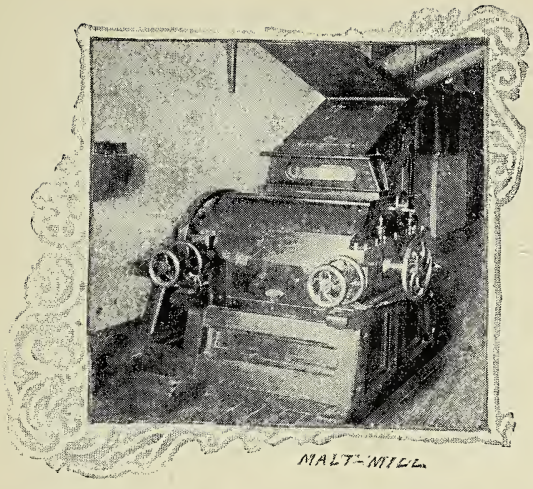
From this charming *Bierstube* we proceed on our tour of inspection, visiting the different parts of the establishment in the order which the process of brewing suggests; our intention being not only to describe this one particular brewery, but also to give the reader a clear idea of the making of beer.

It is to John Barleycorn, immortalized by Robert Burns, and innumerable other poets of less renown, that we must first turn our attention; but we need not follow his career from the beginning, as poetically described by the Scotch bard, for he makes his entry into Hell Gate Brewery after he has already undergone a great part of his sufferings.

"They laid him out upon the floor,
To work him further woe,
And still, as signs of life appeared,
They tossed him to and fro.
They wasted o'er a scorching flame
The marrow of his bones." * * *

The entire poem is undoubtedly familiar to every lover of drinking-songs. In it, the poet describes all the manipulations incidental to the cultivation of barley, from the planting of the grain to the reaping of it; and also all the numerous and manifold operations to which the ripe cereal is subjected, after it has left the farm and passed into the hands of the maltster.

The concluding process of malting, described in the quoted lines, has done its work, when John Barleycorn turns up in this brewery to begin a new series of ups and downs, calculated and designed to still further purify him and render him fit for the climax of his fate. Malt, as every one knows, is obtained by a four-fold treatment of the barley. The grain must be steeped in order to cause germination and produce diastase, the agent necessary for the conversion of starch into that saccharine matter which forms the primary essence of beer; it must next be couched and floored, when it continues to grow and germinate; and, lastly, it must be subjected to kiln-drying by

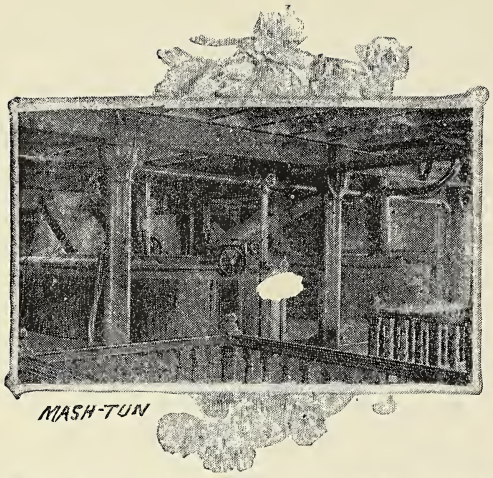


which germination is terminated. When this malt, loaded upon ponderous wagons, reaches Hell Gate Brewery, it is at once conveyed, by means of most ingenious contrivances, into the malt-scales and weighed. On its way to the enormous bins, four in number, which serve as store-houses, it is subjected to repeated processes of sifting, screening and blowing—the latter part being effected by means of air passing through flues or pipes, connected at certain intervals with the shutes through which the malt passes. The storage-bins occupy nearly the whole of one wing of the main building. They form one vast shaft, divided into four chambers, running through several stories up to the top-floor, and leaving on each floor just room enough for a narrow gallery or corridor. The malt is raised to the tower and thence distributed into these bins, which together hold about fifty-six thousand bushels of barley, and are so constructed as to facilitate the utmost cleanliness in every nook and corner of them.

The first operation of the brewer, when beginning to brew, is to grind the malt. John Barleycorn's sufferings here begin where Burns makes them end:

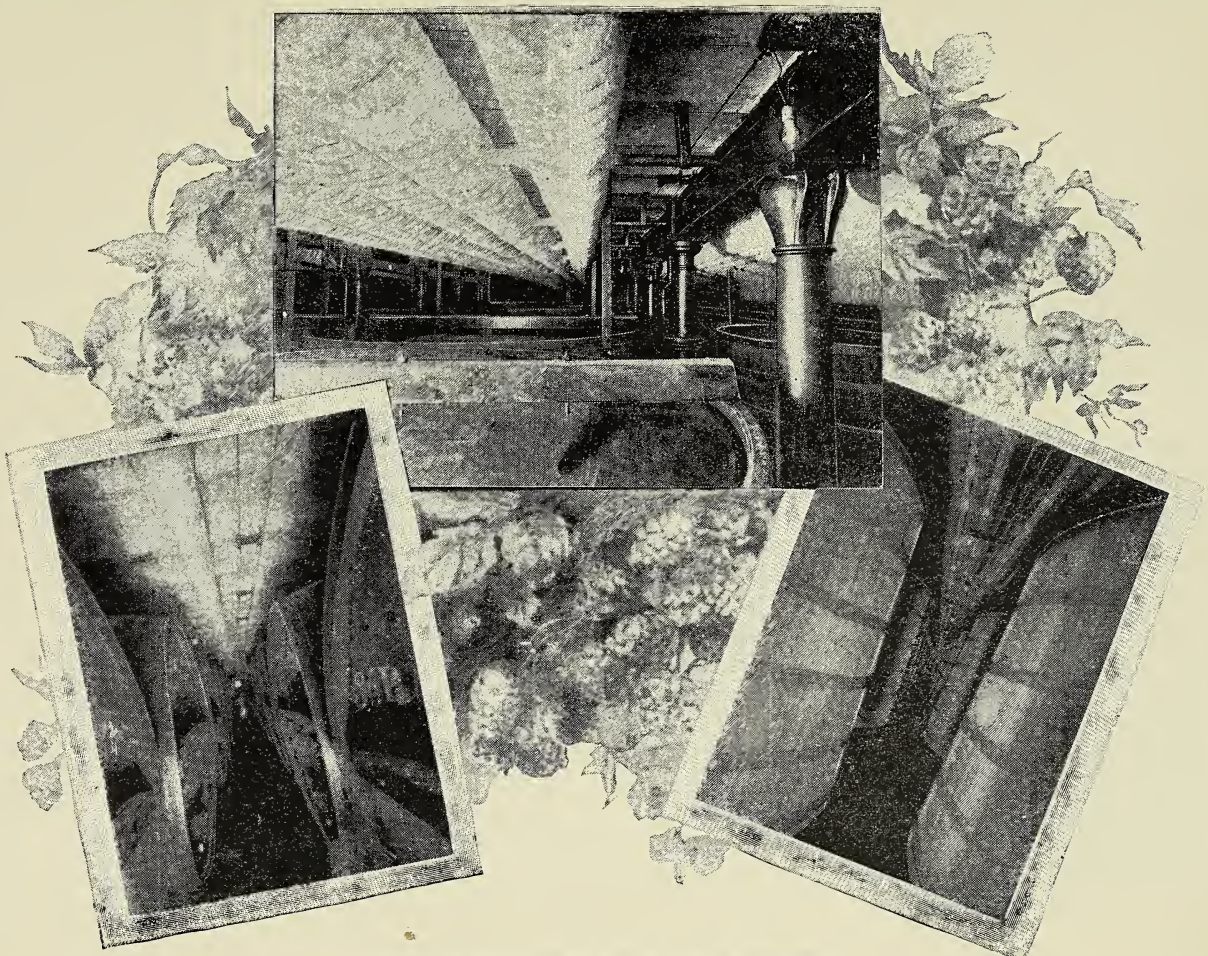
> "But a miller us'd him worst of all
> For he crushed him between two stones."

The same powerful machinery which raises the malt into the store-houses, is now again set in motion to convey the quantity of malt requisite for each brew, from the store-rooms through a series of shutes, shakers, and magnet-studded slides, to and from the scales into the malt mill. On its devious course to this point the malt is shaken upon sieves, rocked to and fro, and constantly accompanied by currents of air, all

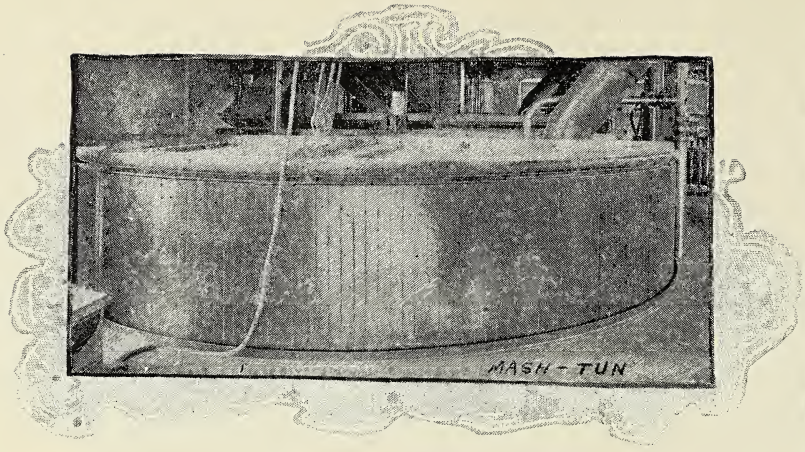

MASH-TUN

of which is intended to separate all germs and dust from the malt, and to leave the latter as free as possible from useless and harmful matter. Shutes covered with powerful magnets, serve to attract and hold nails, bits of iron or other similar metallic substances, which may be in the malt. After being weighed—an operation which one man can perform by simply depressing any one of four levers attached to the scales and communicating with the store-bins—the malt is ground, or rather crushed between metal rollers. In its crushed state, it is again conveyed, in the same mechanical fashion, to the top-floor, where it is deposited in smaller bins, three in number, each holding 500 bushels. The malt-scales, two in number, one for weighing the malt when it is received, and the other to weigh the quantity needed for each brew, are placed immediately below the store-bins. (See illustration page 133.) The double weighing operation enables the brewer not only to calculate, at any time, the quantity of malt consumed and still on hand; but also to determine, with accuracy and without much labor, the exact quantities which he requires from day to day. The latter is very important, because everything depends upon a proper proportion of ingredients.

Simple as all these operations may appear from our description, they are, nevertheless, effected by most complicated and costly machinery, in the construction of which human ingenuity was put to a severe test. The principal object of these machines is not, as might be supposed, the saving of labor, but rather the elimination of chance and accident from this preliminary work of the brewer. These most modern improvements preclude almost entirely the many chances of failure to which a less perfect method of sifting malt will always expose the operation of brewing. The presence of any metallic substance or of an excess of germ or dust, will inevitably spoil the wort. The methods spoken of here not only avoid this, but also tend to insure uniformity of quality, and offer, besides, a certain degree of immunity from the

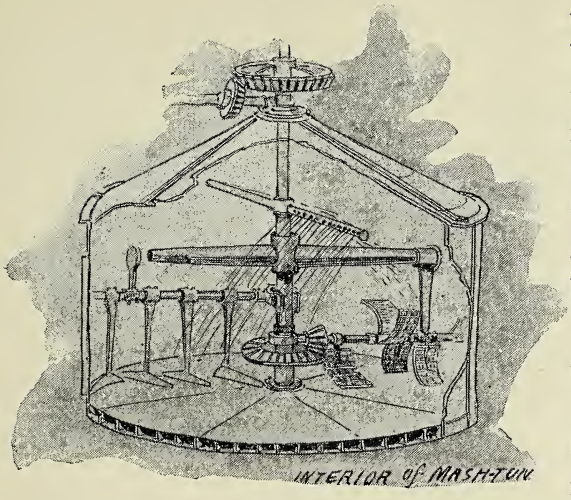


STORAGE CELLARS IN HELL GATE BREWERY.



danger of explosion, which is ever present in any establishment where the elimination and collection of the malt-dust is effected in a less perfect way. As we have seen, the floors of the west wing of the main building serve the purposes of weighing, sifting and storing malt. On the upper floors of the other parts of this building we find, in separate rooms, the smaller bins before described; tuns for preliminary mashing; the cooling tank, and a number of colossal vats containing water of varying degrees of temperature, heated by exhaust-steam.

Having crushed his malt, the brewer now proceeds to mashing, a most important part of his art. The crushed malt is conveyed from the smaller bins to a *Vormaischbutte*, that is to say, a mash-tun in which the malt is thoroughly mixed with water, preparatory to its transfer to the regular mash-tuns. Neither manual labor nor physical efforts of any kind are required in thus conveying the malt to the mash-tuns; everything moves by steam-power. The object of mashing, *i. e.* the process of infusion or mixing the malt with water at a proper temperature is two-fold, viz. 1, to extract from the malt the saccharine substance and dextrine which is contained therein; and secondly, to convert into maltose and dextrine the residue of unconverted starch. Our illustration on page 37, being a combination of three views of the floor on which the mash-tuns are placed, gives a good idea of this part of the establishment. The three immense iron tubs, in which the malt is mashed, are set in wooden frames, rising about four to five feet above the flooring. Here, too, the magnificent plant of steam engines, of which we shall speak later on, is brought into application; it sets in motion the mashing apparatus within the

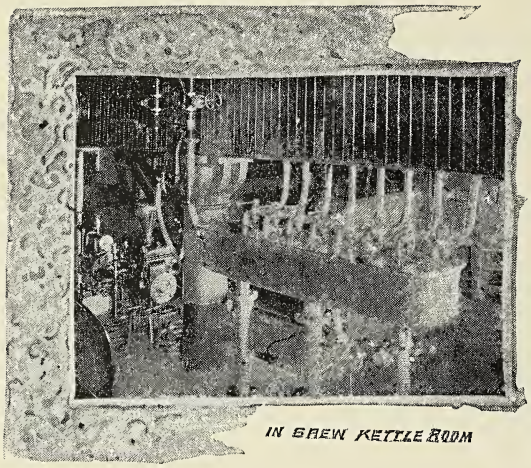


tun, which is composed of a number of raking contrivances fastened upon two huge arms, revolving in opposite directions around central pivots, in such manner as to mix every particle of the grain, as it drops from the "Vormaischbütte" on the floor above.

Now is the time to realize the importance of the perfect cleaning and grinding of the malt, for the result of mashing depends in part upon these two preliminary processes. If the malt be insufficiently crushed, much of the extract will be lost, or rather, to be more precise, much of the starch will resist infusion and thus remain bound up in the grain, which latter then passes out of the tun with a considerable portion of its starch adhering to it. If, on the other hand, the malt be crushed too fine, or if it be insufficiently cleaned, retaining large proportions of dust, a part of the wort will become pasty and absorb much of the "goodness," thus impairing the quality of the beer.

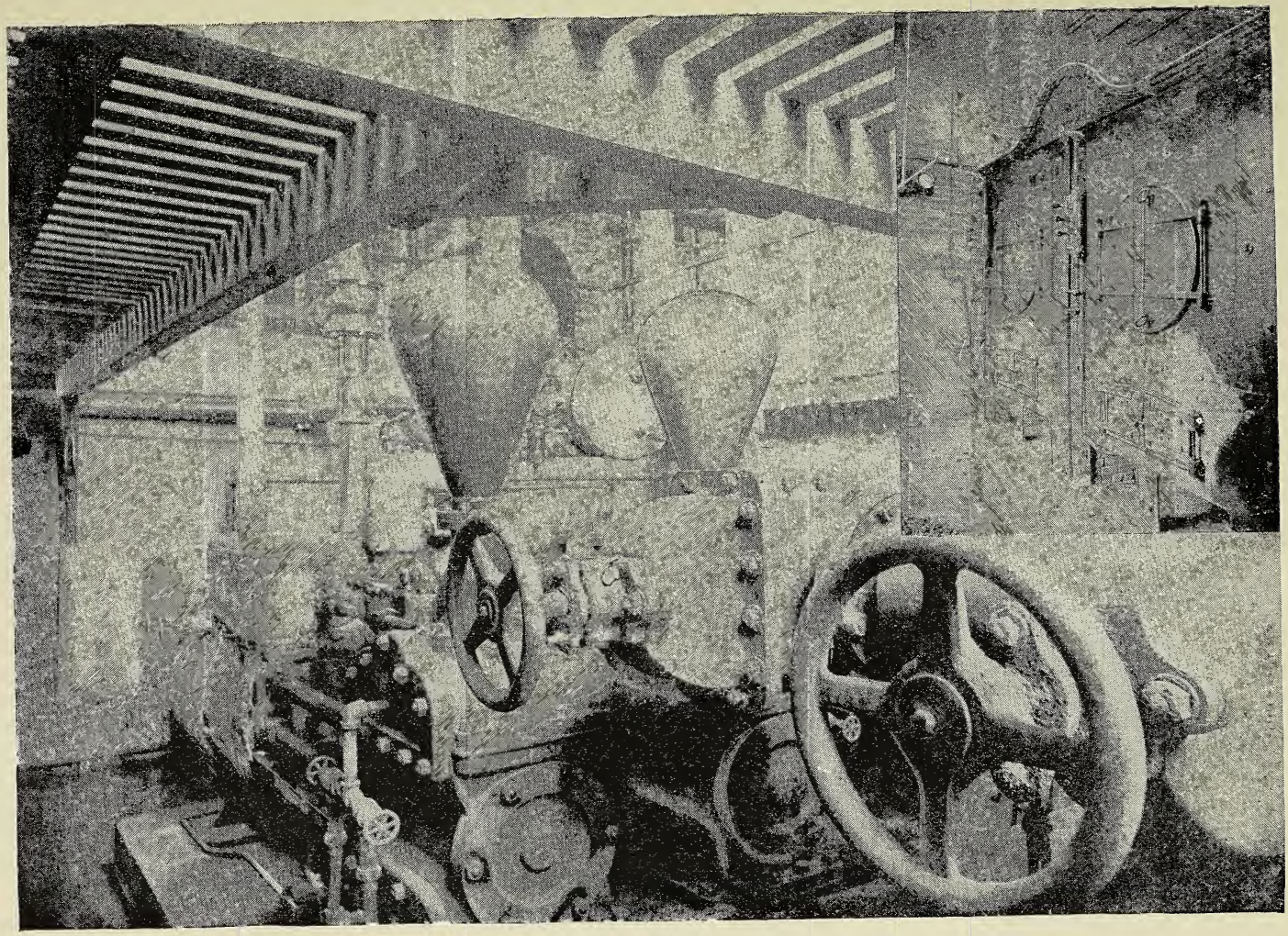
Before the invention of the modern appliances before referred to, the very best raw material frequently failed to yield the results which the brewer was justified in expecting from it, and such failures, the true causes of which were rarely understood, gave rise to trade-superstitions which the modern brewer laughs at, conscious of his superior knowledge.

While the process of mashing is going on, the brewmaster must be constantly on the alert; he must watch the temperature of the water, with which he mixes his malt; guage the effect of the heat upon the quantity and quality of his mash; and determine, at a glance, almost, when to open the valves of the mash tun, in order to draw off the wort into the copper or boiling kettle below. As in everything connected with brewing, science furnishes him a reliable guide in the shape of a sacchrometer, which indicates the proportion of sugar in the wort, and other instruments with which to test temperature, etc. When the opportune moment has arrived for drawing off the sugar-laden

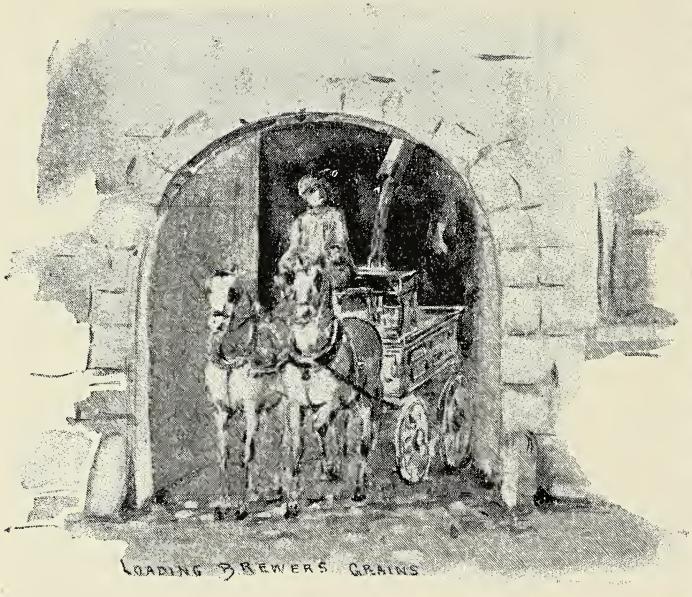

IN BREW KETTLE ROOM

liquid, the brewer opens valves or doors in the bottom of the mash-tuns, through which the wort runs into pipes, and through a filtering apparatus into the boilers on the floor below. While this is going on, and before half of the wort is run off, we witness another operation, called sparging, by which the useful substance still remaining in the malt is washed out. Our vignette on the preceding page shows the sparging apparatus in operation. By it, a continuous shower of hot water is evenly thrown on every part of the grain; it issues from hollow arms, perforated on their reverse sides, and horizontally fixed to an upright pin. As soon as the water begins to force its way out of the holes, in opposite directions, these arms revolve automatically; the raking appliances, meanwhile, continue to whirl around, constantly stirring up the mash, thus enhancing the effect of the water and accelerating the operation. Insufficient or ineffective sparging means a considerable loss to the brewer.

When sparging is completed, the brewmaster changes the scene of his activity; he descends to the floor immediately below the one where his mash-tuns are placed. These two floors are closely connected with each other; in fact, through large openings in the ceiling, which openings are surrounded by substantial guard-rails, we gain an almost unobstructed view of both rooms at one and the same time; and even if we knew nothing at all of brewing, the sight of so many pipes, tubes, funnels and shafts connecting the upper floor with the lower, would convince us that the closest relation exists between the two rooms. On this lower floor our attention is at once attracted by three huge copper kettles, every part of which, as well as the many pipes which we see here, at once impress us with the truth of the saying, that when a brewer is doing nothing, he cleans and polishes his utensils. Indeed, the pride which every journeyman-brewer takes in the cleanliness of the establishment is made

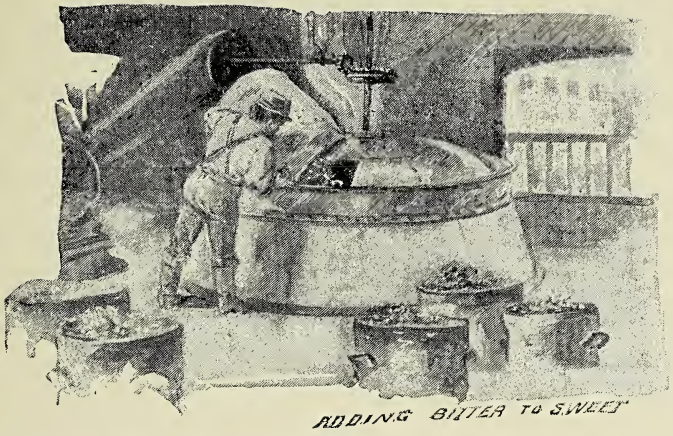


HELL GATE BREWERY PUMPING STATION IN EAST RIVER.



manifest at every step we take; but here, in the kettle-room, where every object far and near is faithfully reflected, as if in a mirror, upon the resplendent sides of the brew-kettles, an extra effort seems to have been made to outshine every other department. (Illustration of brew-kettle room on pages 41 & 45.

The liquid which now runs from the mash-tun into the boiling-copper contains all the ingredients which constitute what we may call the body of the beer; it is the extract of a highly nutritious grain, gained in such a way as to justify the designation of liquid bread, which an eminent chemist has assigned to malt-liquors. But all the nourishing qualities of the grain have not been extracted; a very large proportion, comparatively speaking, remain in that part of them for which the brewer has no further use. In Hell Gate Brewery these grains are conveyed through large pipes from the mash-tuns to the ground floor, or, rather, to an arch-way where wagons may be brought to receive them. They are used as food for cattle and have proved to be the best nutriment for milch-cows. According to the exhaustive analyses made by the Agricultural Experiment Station of this State, and many other investigations, brewers' grains, even when no longer perfectly fresh, are unusually nourishing, and, when fed to milch-cows, tend to increase the quantity and enhance the quality of the milk. It is estimated that no less than two-thirds of the bulk of brewer's grains, as they issue from the mash-tun, consist of water, and this moisture not only militates against the transportation of the grain to rural points, but also accelerates decomposition—two reasons which have prevented a more general utilization of the grains by dairymen. A number of

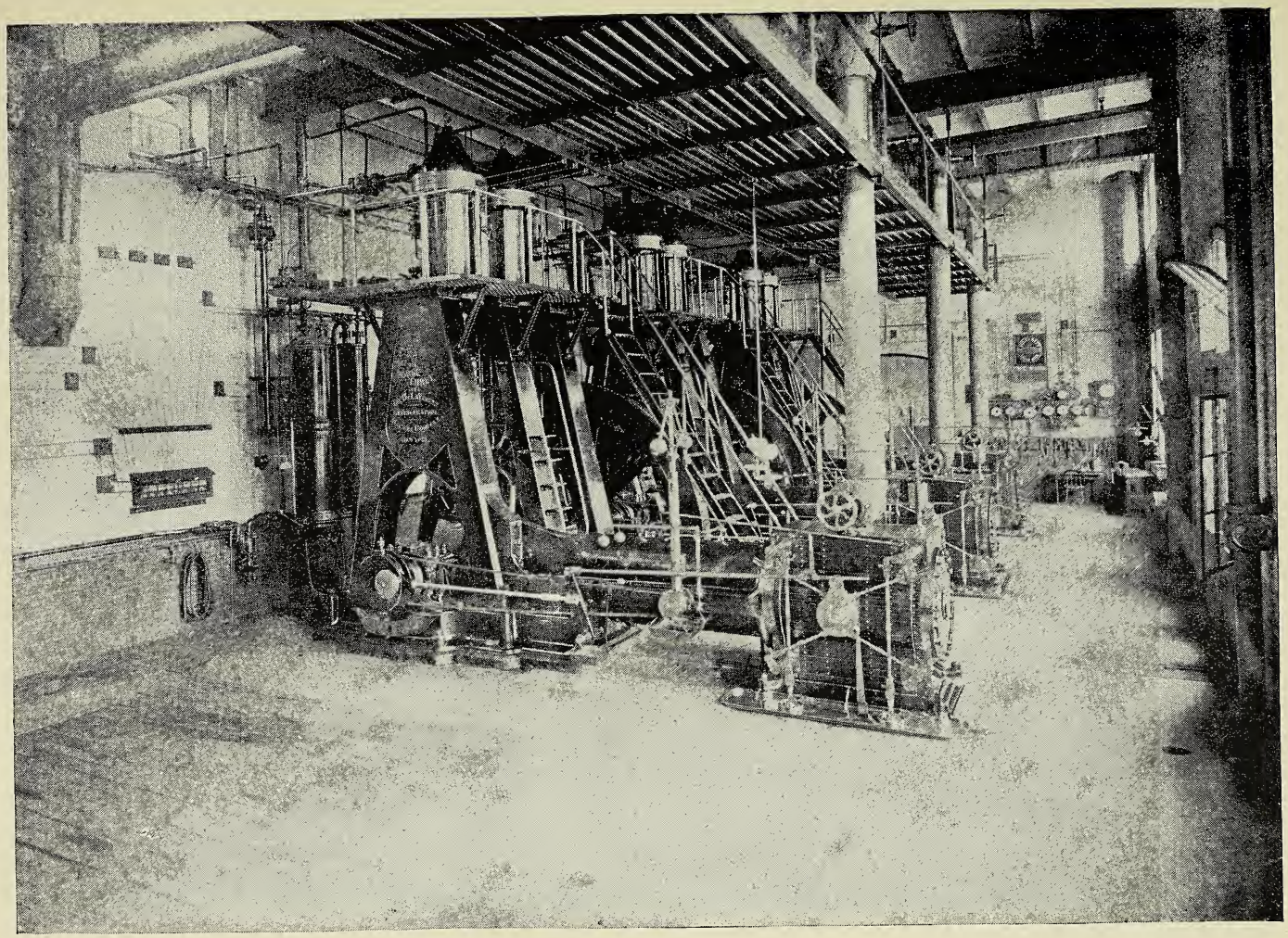


grains-drying machines have been invented, and we learn of others in course of construction, by which the grains may be profitably dried and preserved.

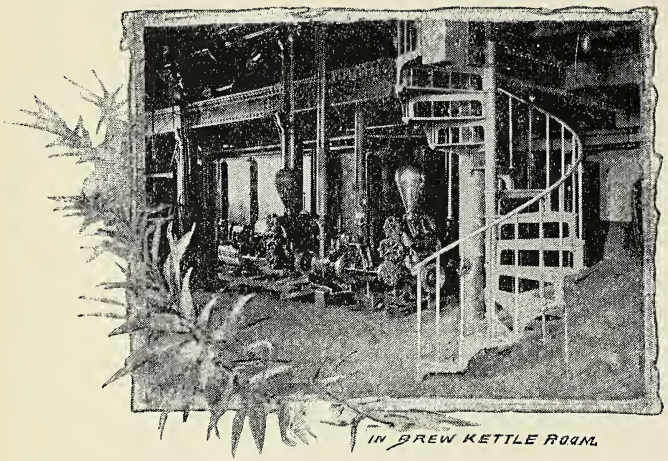
The boiling of the wort in these three huge coppers is another one of the essential phases of brewing. The heat required for the boiling is furnished by boilers which send a continuous current of steam through coils fixed in the copper. As will be seen from our illustrations, these coppers have covers with small sliding doors, which, during the process of boiling, are rarely opened except to enable the brew-master to make his tests. Were it not for these covers, the boiler-room would be enveloped in an impenetrable cloud of steam, which would greatly hamper all manipulations. As it is, the steam finds an outlet through a large pipe or flue fixed on top of the copper. It is at this stage that the hop is added to the wort, but not until after the latter has boiled a sufficient time. Usually, the boiling requires four hours ; at the expiration of the third hour, or still later, perhaps, the brewer will empty the contents of several large sacks full of aromatic hops into the copper, thus adding the bitter principle to the saccharine. The proper treatment of the hops at and during this stage always has been a matter concerning which few brewers shared the same opinion ; but of late scientific investigations have removed many prejudices which arose from a misconception of the nature, ingredients and functions of the plant. At present, the average brewer fully understands that he can extract the essence of the hops without excessive boiling. The object of the boiling is : 1. To concentrate the wort ; 2. To extract the essence of the hop ; 3. To coagulate the unchanged albuminous substances and cause them to settle, together with the unconverted starch which if allowed to remain intact, would materially militate against the preservation

of the beer. But this does not do justice to the important functions of hops; at least it is to be feared that, to the average reader, it will not convey a clear idea of the action of this tender plant upon the wort. Without it, beer would be nothing more than fermented barley-juice, which, as we have seen, was known to the most ancient nations. Without it, beer could not be preserved for any length of time, and both in appearance and flavor would be greatly inferior to the drink of to-day. Hence, hops not only impart to beers their pleasantly bitter and aromatic flavor, but they also assist in clarification and produce the preservative qualities of the liquid. The two principal substances which the hop-cone yields, when boiled, are lupulin and tannin, and it must be the brewer's aim to extract these in just that proportion which the condition and quality of his wort requires. Injudicious handling of the hops may result in an excess of tannin and a deficiency of lupulin, and may otherwise work injury to the finished product. The diminutive sparkling grains of the hop-flower, called lupulin, are closely wrapped up in the centre of the hop-cone, and should be laid bare before the plant is placed in the copper. To this end most brewers will break up the hops, and the brew-master at Hell Gate Brewery showed us a most ingenious, and yet exceedingly simple machine which performs this operation in a highly satisfactory manner.

Hops, as delivered at the brewery, are packed in large bales, each weighing 180 pounds; the quantities required for immediate use are taken out of these bales, broken on the machine above referred to, and then placed loosely in



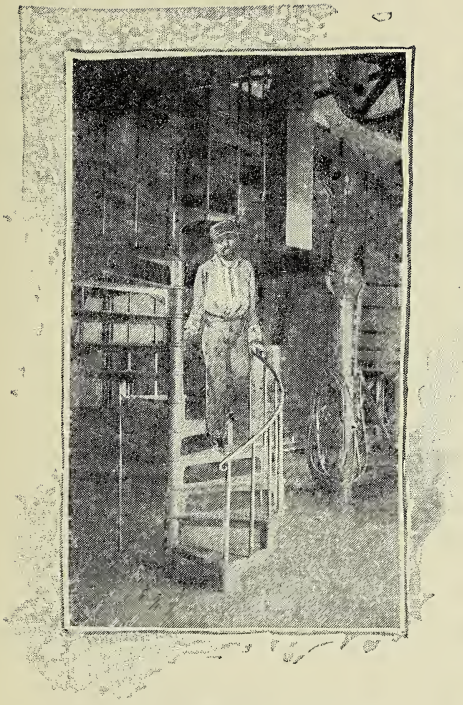
REFRIGERATING MACHINE IN HELL GATE BREWERY.



IN BREW KETTLE ROOM.

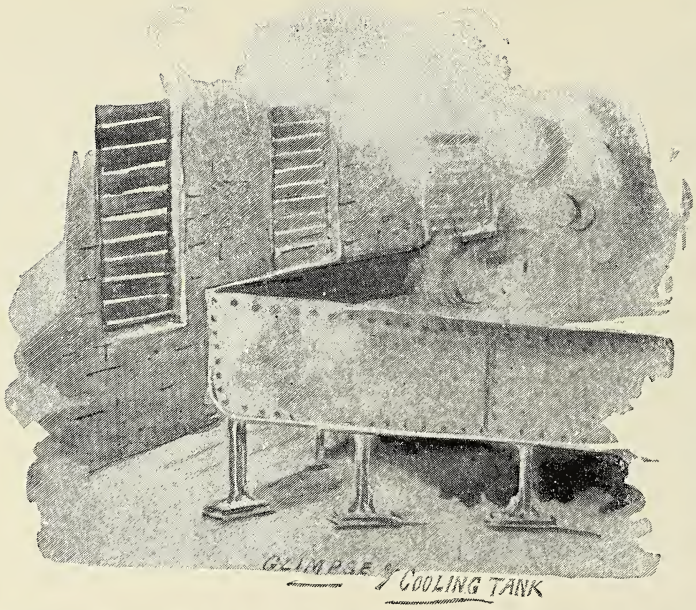
large canvass bags, provided with loop-like handles. As a matter of course, these quantities are all carefully weighed before being dumped into the copper. Scientific observation and practical experience have taught the brewer not to boil the hop too long. Formerly the plant was boiled "all to pieces," the object being to expedite the precipitation of the albuminous wort by means of the extracted tannin. At present, the boiling time is reduced to a minimum, and yet, by reason of the opening of the hop-cone, the effects and essential functions of the hop are not in any manner impaired.

In the purchase of hops, the brewer must use good judgment and great care so as to secure an article rich in lupulin, fully mature, not too old, cleanly picked and properly dried. If he obtains such hops, he may still have room for complaint on account of the lack of that flavor which is the result of long-continued cultivation and the natural advantages of a favorable soil. The latter causes have made Bohemian hops famous all over the world. Any brewer who strives to produce the very highest grade of beer will always use a certain proportion of these extra-aromatic hops in conjunction with the domestic product. For all practical purposes, however, American hops are as good as, if not better than, the average foreign article, with the exception of the brands we have named and a few others, the production of which is also confined to a rather narrow territory. In Hell Gate Brewery the stock of foreign and domestic hops covered, at the time of our visit, two very large floors of the spacious store-house. There being then, arranged in seemingly



interminable rows, no less than one thousand bales, or one hundred and eighty thousand pounds of foreign and domestic hops. (See illustration on page 49.) We shall presently say a few words in regard to the mode of raising and curing hops, and the production and consumption of the same throughout the world.

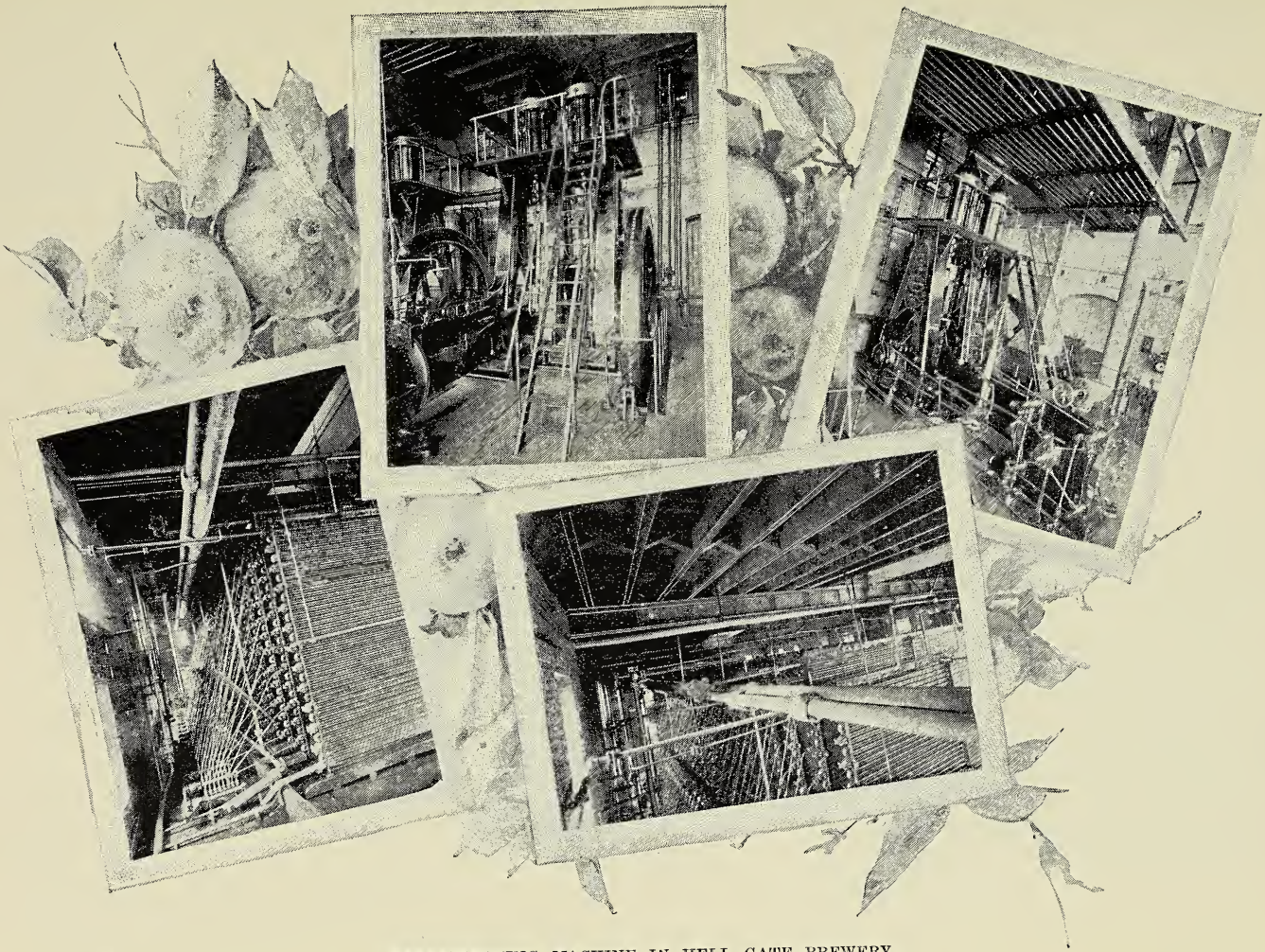
When the boiling is completed, the brewer again descends to a still lower floor, where we see, besides many engines, pumps and other gear, a large black rectangular tank which is placed directly under, and connected with, the boiling-coppers. This is technically called a hop-retainer or hop-back; the former term undoubtedly more intelligible than the latter, and certainly more appropriate, because the function of this tank is to check or retain the hops, while the hopped wort, flowing through open valves in the bottom of the coppers, is being rapidly pumped back to the top floor, where an expansive iron receptacle, called the cooling-tank, stands ready to receive it. Poor John Barleycorn! In different conditions he has now made this same trip up and down for the fourth time, and yet the end of his journey is still far off. The contrivance which effects the retention of the hops consists of a perforated false bottom within the hop-back, or, in other words, of a sieve equally as large as the iron tank into which it is fitted, and so fixed as to leave between it and the real bottom of the vessel a sufficient space for the reception of the wort. At this stage, the head-brewer thinks of but two things, namely, to send his wort to the cooling-tank as rapidly as possible and to have it reach its destination bright and brilliant. For the latter purpose he allows the wort



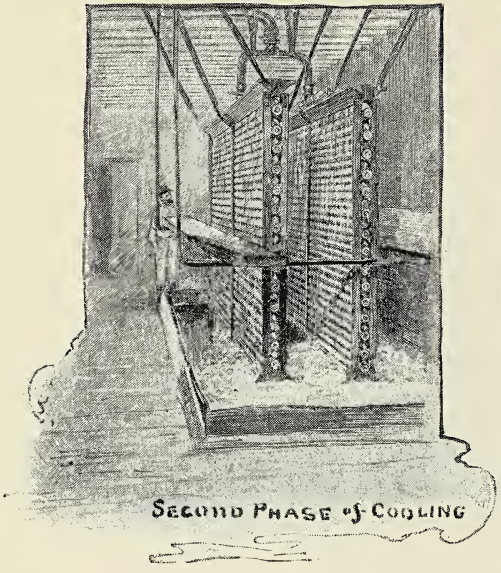
GLIMPSE OF COOLING TANK

to settle in the hop-back for about twenty minutes; this done, he adjusts the pumps, sets them in motion, and then ascends to the top floor to watch the steaming liquid, as it issues from the pipe, and, with a sound between a hiss and a roar, rushes into the tank. If we wish to form an idea of the shape and dimensions of this cooling-tank, we must do it now, for in a few moments, as the hot liquid accumulates, a dense cloud of steam, fraught with the enlivening aroma of the hops, begins to fill the immense room, rendering everything indistinct, except when a particularly strong gust of wind rushes through the wide openings in the lattice-work of the windows and for a moment lifts the vaporous veil. The shape of this vessel is that of a gigantic rectangular pan; its depth is three feet; its lateral dimensions are 30x42 feet; its capacity equals that of two of the three boiling coppers, each one of which holds three hundred and seventy-five barrels.

Although he has the most perfect refrigerating apparatus at his command, our brew-master now evinces considerable anxiety; he is pretty sure of the usual result of his operations; but he knows "there's many a slip between the cup and the lip," or, rather, between the cooling-tank and the fermenting tun; and right here appears to be the only loophole which human ingenuity left to chance. His object is to reduce the temperature of the liquid and render the wort properly amenable, in the desired measure, to the action of

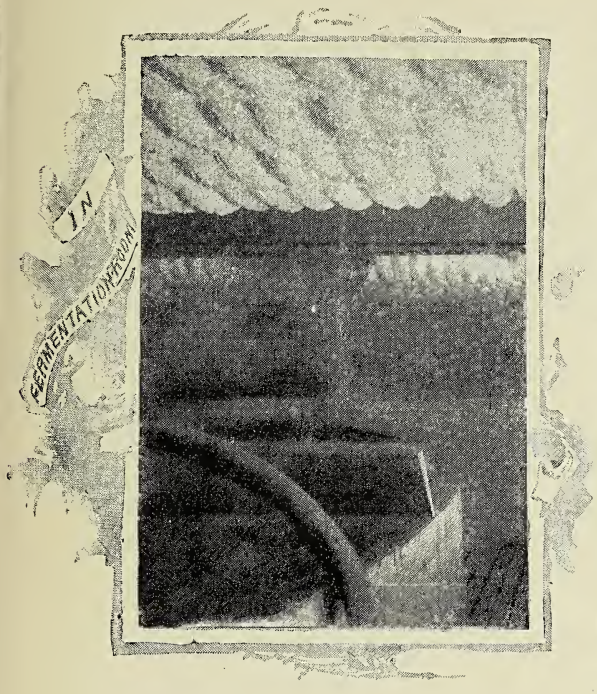


REFRIGERATING MACHINE IN HELL GATE BREWERY.



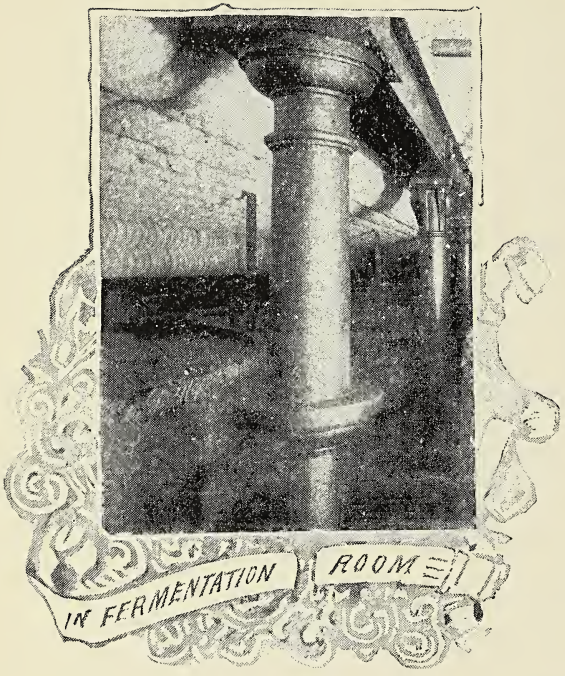
the yeast which he will presently add to it, and thus place it in a fair way for the beginning of fermentation. But, unless this is done rapidly, the wort may turn sour, and, besides, many believe that other dangers usually accompany a protracted exposure of the liquid to the open air. In many breweries, particularly those situated on depressed ground, or hedged in by other high buildings, artificial means are employed to accelerate this first stage of the cooling process; in Hell Gate Brewery this would not be necessary (although the requisite appliances are at hand), by reason of the favorable location of the buildings and their uncommon altitude.

Cooling is one of the most interesting, as it is one of the most important, phases of brewing. The manner in which it is accomplished in model-breweries of to-day, impresses us with the greatness of science and its illimitable resources when pressed into the service of a progressive industry. Formerly, the successful brewer of lager-beer depended very much upon the climate, the supply of ice and the chances of securing what the German style "Felsenkeller," rock-cellars; that is, deep caverns hewn into the rocks. The refrigators of to-day completely emancipate the brewer from the thraldom of these contingencies; he can now brew almost anywhere and everywhere, even in Southern climates. Mild winters and consequent scarcity of ice have no terrors for him; and if it were not for his second nature to utilize every natural advantage offered him, he might get along without any cellars, certainly without "Felsenkeller." From the cooling-tank the wort is conveyed through pipes into a pan, whence it trickles over two refrigators, of the pattern



shown in the vignette on page 74. These two refrigators are on separate floors, one above the other; the one over which the wort passes first is supplied with water from an artesian well; the other derives its cooling capacity from a refrigerating plant, of which we shall presently speak at some length. Having now reached the temperature most suitable for the beginning of fermentation, the wort passes directly into the fermenting tuns.

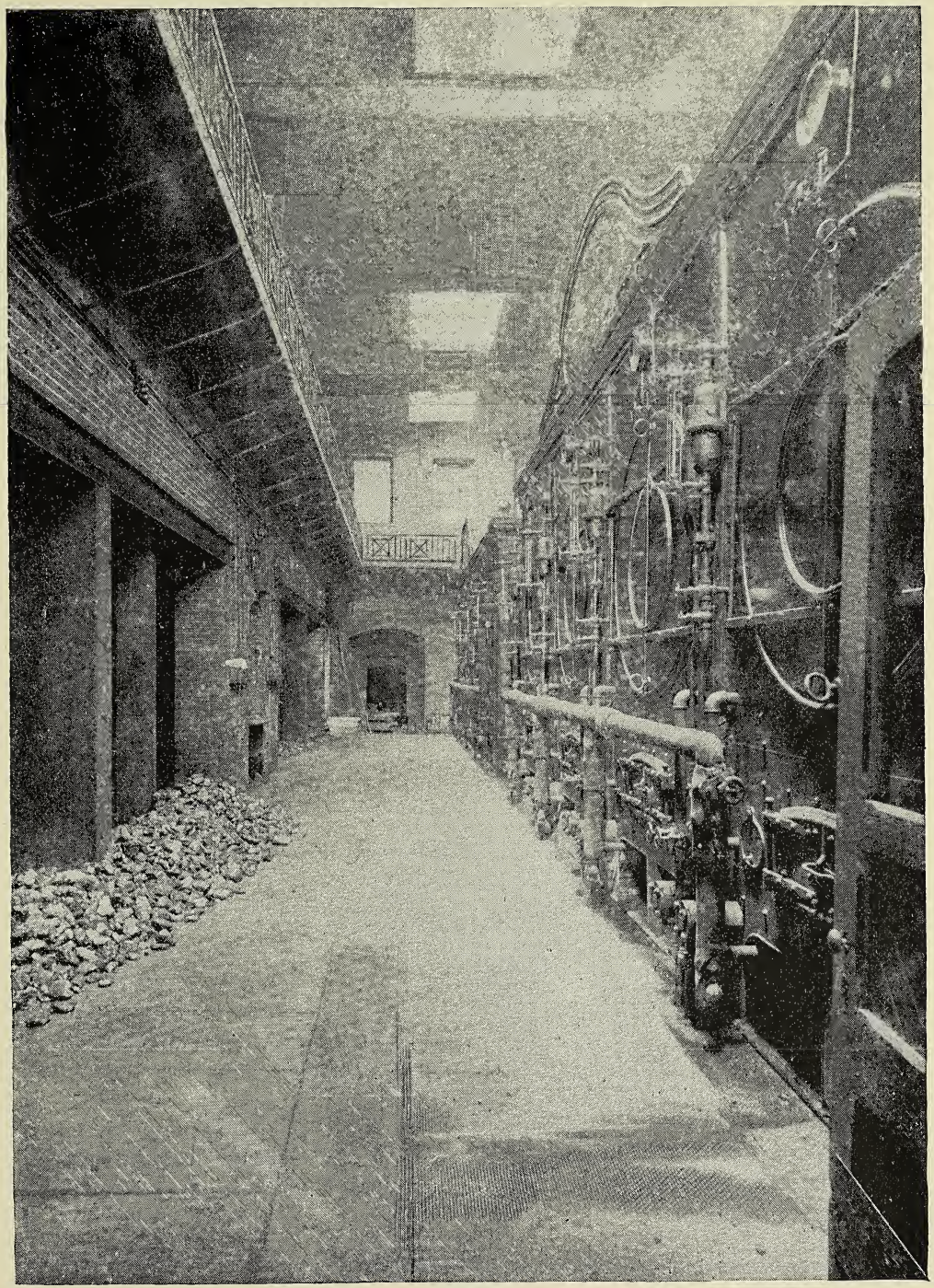
Fermentation, artificially induced by the admixture of yeast, at the rate of about one pound per barrel, sets in at once and gradually converts the saccharine principle into alcohol and carbonic acid gas, thus imparting to beer that quality which places malt-liquors in the category of intoxicating beverages. The fermenting-room, of which our artist presents a very good picture on page 57, makes a most singular impression upon the visitor. From the warm, airy, light-flooded rooms above, where everything appears in roseate hues, he passes almost immediately into a seemingly absolute darkness, and an atmosphere that sends a chill through his bones. He advances slowly with extreme caution, relying entirely upon the sense which guides a blind man, until his eyes become accustomed to his sombre surroundings and he begins to discern, vaguely as yet, the colossal vats which line the narrow passages and extend —interminably, it seems—into still denser darkness. In reality the room is not as dark as it appears; but the sudden transition from the light of the upper floors to this uncertain darkness makes just that impression, greatly enhanced by stray rays of light which fall through narrow apertures. But there



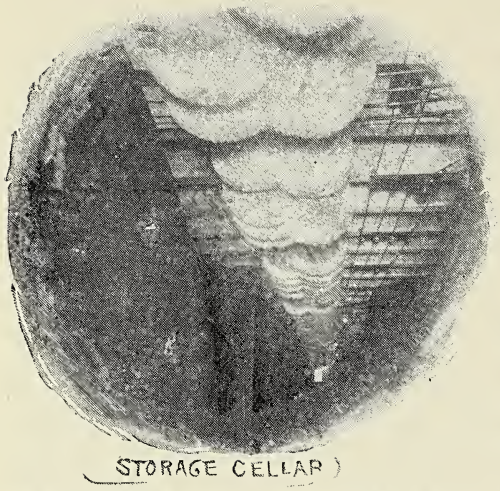
this is no mere illusion about the temperature. It is cold, indeed! When the cellar-master, who has now taken the place of the head-brewer at our side, summons one of the workmen to turn on, one by one, the electric lights distributed over the cellar, and himself begins, in a methodical manner and not without a touch of pedantic accuracy, to describe things; while our artist goes into ecstacy over the chiar-oscuro effects produced by the pendulous lights, we turn up the collar of our coat and shiveringly but solemnly resolve to confine our next visit to the upper regions, and to let our illustrator revel in Dantesque visions as long as he may please.

While fermentation continues, the same vigilance which prevails in every part of the brewery, must be constantly exercised. The conversion of sugar into alcohol and carbonic acid gas should be gradual, not sudden; hence, when the fermenting process becomes too rapid, either by reason of defective yeast or on account of the unsuitable temperature, it must be restrained by means of attemperators, that is, coils which are placed in the fermenting-tun and connected with the refrigerating plant.

As in all other operations thus far described, so here, too, the inventive genius of our age of inventions has placed at the command of the brewer machineries with which he can regulate the temperature of these oceans of turbulent, foaming liquids, either by a light pressure of his hand, by the turning of a small wheel, by pressing upon a knob, or by any other equally simple manipulation. In this fermenting room, as well as in the cellars, into which we



STEAM BOILERS IN HELL GATE BREWERY.



STORAGE CELLAR

shall pass presently, everything assumes Titanic proportions; and the human beings who move about these places, appear like pigmies. When we see fermenting-tuns holding from three hundred to four hundred barrels, and settling tuns of the size of an ordinary house, extending through two stories, and holding seven hundred barrels or twenty-one thousand seven hundred gallons of beer; and when we consider that these monster-casks, filled with John Barleycorn's blood, cover miles upon miles of cellar-room, we begin to realize and appreciate the power of the engines which are at work in this brewery.

As fermentation progresses, workmen are constantly in attendance to watch the process. On ladders, almost three times the size of their own bodies, they climb to the top of the tuns to skim the beer with huge laddles, testing at the same time, by taste and touch, the condition of the liquid mass, in order to determine when to draw it off to the resting tuns.

The transfer of the beer from the fermentation vats to the resting tuns and from these to the storage casks is accomplished by hydraulic and air pressure, and in such a way as to require no other labor but that of opening or closing valves or depressing levers. As we descend into the cellars, three stories under the ground, the temperature becomes more and more stinging, the walls and ceilings are covered with ice to the depth of from three to five inches, and every vat and cask is thickly encrusted with frost. In forming an idea of the capacity of these cellars, we cannot simply depend upon the number of square feet of ground occupied by them, because both the vats and casks rise to a height almost equal to that of the cellars, and they vary in

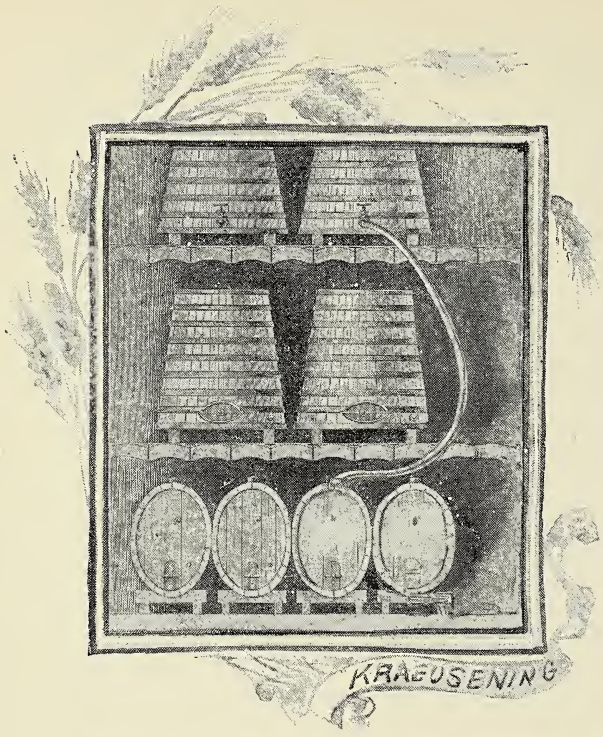

A DISCARDED OPERATION

capacity from fifty to five hundred barrels. The beer contained in them would float a fleet, since their aggregate minimum capacity amounts to 125,000 barrels.

The last operations to which the beer is subjected are those of cleansing, fining and kräusening. The beer passes from the settling vats to the storage casks, in which it remains from five to eight months, when, after another winding journey through miles of pipes, it emerges bright and clear and brilliant, only to be racked, that is to say, only to be filled into the kegs which go to the retailers.

The same continuity of operations which we have witnessed on the floors above ground, is also observed in the three tiers of cellars, and the relation between the latter is almost as close as that between the former. We have already indicated the character of the connection which exists between the different kinds of tuns, vats and casks into which the beer is filled at different stages after the brew is completed. We have seen that fermentation takes place in open vats, and is regulated by attemperators, fed by the refrigerating plant and by means of powerful pumps. Formerly, another means of restraining fermentation, which was applied manually, was resorted to; it consisted of conical cans, called swimmers, which the brewer filled with ice and placed into the fermenting liquid, where they floated about and depressed the temperature. Since Mr. Ehret has introduced the attemperators into his brewery, the swimmers have been entirely discarded; we, nevertheless, give a picture of this cooling operation, so as to preserve a recollection of what future brewers may regard as a curiosity.

When the desired results of fermentation are secured, then, and not until



then, is the wort transformed into beer; but before it becomes fit for consumption, it must rest for a considerable length of time to be then transferred to the storage casks, where the processes of fining and kräusening take place. For the former process, chips or shavings are used, usually those gained from the beech-tree, by which the muddy particles, resulting from fermentation and still remaining in the beer, are attracted and held, leaving the bulk of the liquid clear and translucent. While this is going on, large quantities of carbonic-acid-gas continually escape from the lager-casks, and, ultimately, in order to re-enliven the liquid, a second fermentation must be produced by adding one-fifth of new beer to four-fifths of the old. This is done by means of pipes which convey the new beer through two tiers of cellars to the lager-casks.

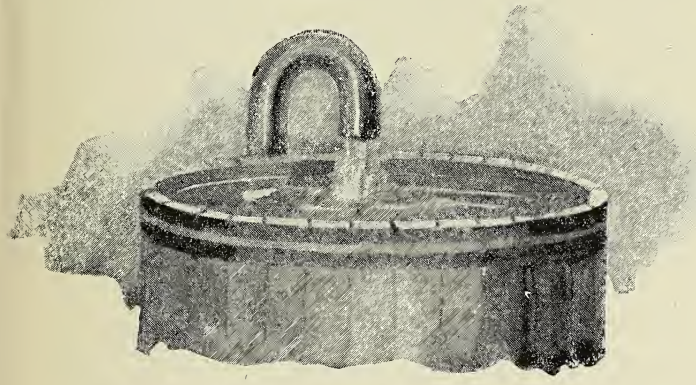
Mashed, sparged, boiled, cooled, doubly fermented, clarified and thoroughly aged, the beer is now ready for racking. This is done by several gangs of men at the same time. The quantity to be racked and the capacity of the packages to be filled being known, the foreman is enabled to determine how many kegs must be held in readiness. Each "racker" has a given number of kegs before him. Above a wide board, which runs along the wall, there is a long row of faucets through which the beer, drawn from the lager-casks, flows into a detachable hose and thence into the kegs. When one keg is full, the hose is quickly inserted into another, and, while this is being filled up, the first is being closed with a wooden bung

STEAM ENGINES IN HELL GATE BREWERY.

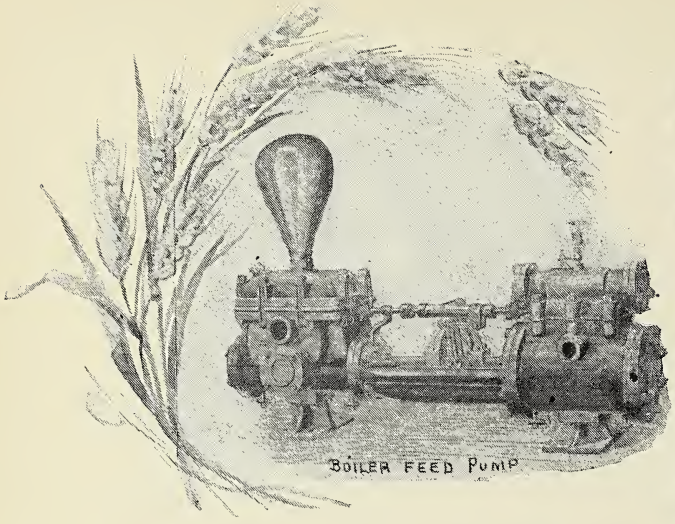
tightly hammered into the bung-hole. In the lower end of the pipes, to which the faucets are attached, glass tubes are inserted which enable the "racker" to discover immediately the slightest change in the color or clearness of the beer. When such a change occurs, the stream of beer must be turned off at once, because the presence of muddy particles indicates that the sediment in the lager-cask has been reached and is being stirred up. Since the introduction of an electric-light plant into Hell Gate Brewery this task, like all the work done in the cellars, gives more satisfaction and is performed with greater ease and with far more accuracy, than formerly. In fact, the employment of the many modern improvements which have been adopted during the last quarter-century, exclude chance and accident almost entirely, and enable the brewer to accomplish his purposes with precision and certainty.

The kegs are now ready for delivery to the retailer, and pass out of the proper domain of the brewer, until they are returned empty and are again conveyed to the wash-house, or, perhaps, if their condition should require it, to the pitching-yard or to the cooper-shop—all of which places we shall presently visit on our tour of inspection.

WATER, ICE, STEAM, AND LIGHT.



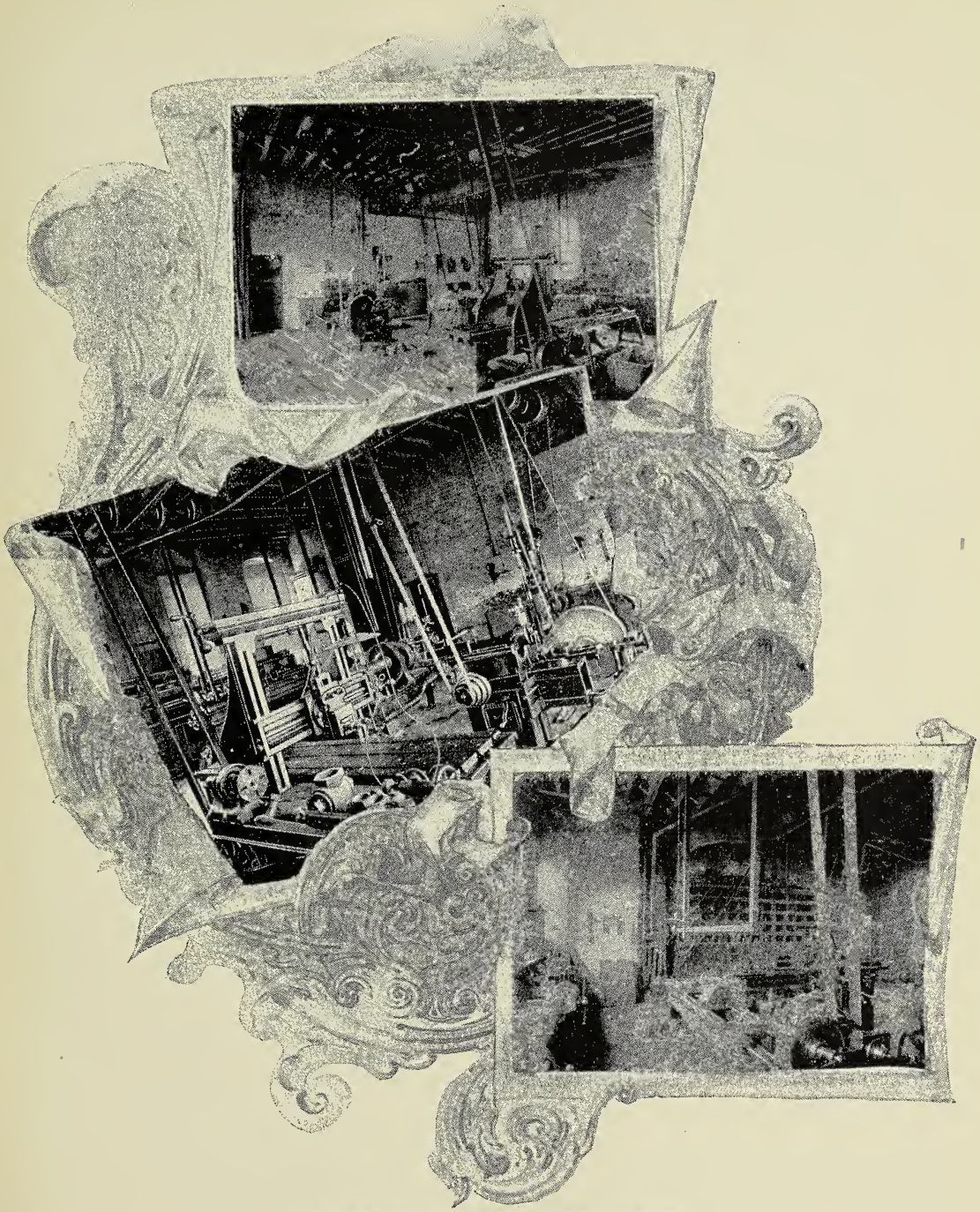
HAVING witnessed the process of brewing, from the grinding of the malt to the racking of the beer, we now turn our attention to the extensive and complicated plant which furnishes Hell Gate Brewery with water, ice, steam and light. The first inquiry addressed to the brew-master concerning the water brings on a highly interesting lecture on the importance of this element in brewing, and the difficulty of obtaining it in the state best suited for our purpose. True, the water which gushes from the gneiss-rocks of Manhattan Island, as well as that which is conveyed to us from afar through the aqueduct, is very good and wholesome; but it will not bear a comparison with the water that the Munich brewer receives from the river Isar, nor that which, ever since the 13th century, has rendered famous the ales of Burton-on-Trent. The reputation of the Munich beer is quite as old as that of this English ale, and in both instances popular superstition attributed the excellent qualities of these beers to secret recipes, possessed only by the monks who operated the breweries. The real and only secret, however, was the exceptionally favorable quality of the water. Our water is not the worst by any means; quite the contrary, it is, as we have said, good and suitable enough for brewing; but not a single experienced brewer in our land would dare to deny that if we had Isar water, our beers would be better than those of Munich; in fact, even with this difference in the water operating against us,



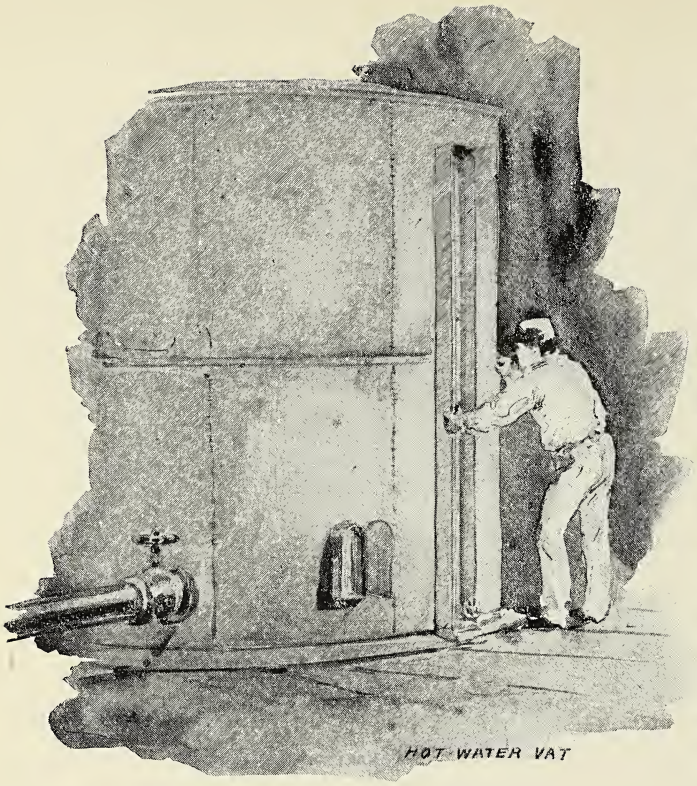
the "Franciskaner" beer of Ehret brewery is pronounced by connoisseurs to be superior to the average Munich beer.

In an establishment of the size of Hell Gate Brewery, water plays an important part, not only as a component of beer, but also as an essential agent of cleanliness, motive-power and temperature. For all these purposes the ordinary supply of water does not suffice. To cover the deficiency, Hell Gate Brewery has two sources from which copious supplies are drawn. The one is an artesian well, which yields, daily, 50,000 gallons of water; the other, a pumping station on the East River which, during the summer months, or whenever needed, supplies, daily, 900,000 gallons of salt water, used for the condensers of the refrigerating machine. Our illustration on page 65 represents this pumping station. The artesian well is seven hundred feet deep, drilled through solid rock, and constructed in the best manner; it is worked by a powerful duplex pump. The enormous quantities of water flowing into the brewery, and used for purposes other than brewing proper, supply eight steam boilers, furnishing steam for fourteen engines of twelve hundred horse-power; a refrigerating plant, consisting of three machines, of an aggregate ice-melting capacity of 330 tons; the different stables, and the wash-houses, where barrels, chips, wagons, etc.; are cleaned.

In describing the different floors on which the processes of mashing, boiling and cooling are carried on, we noticed the presence of many large wooden vats full of water. The water in these vats, used principally for mashing and boiling, receives a preliminary heating by means of exhaust-steam, which proceeds from the brewery engines and would be wasted, unless utilized in the

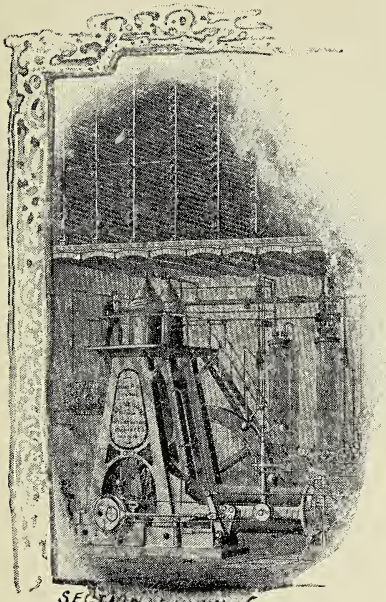


MACHINE SHOP IN HELL GATE BREWERY.



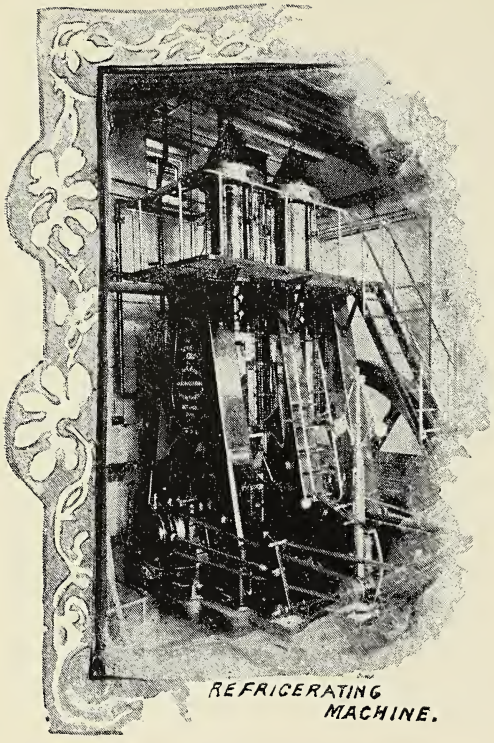
HOT WATER VAT

manner indicated. An apparatus, specially designed for this purpose, conducts the exhaust-steam into coils fixed in the vats; in this manner the temperature of the water is raised and less heat is required to bring it to the boiling-point. Ordinarily, these vats are entirely covered with thickly padded canvass, to the end that the heat may be more effectually retained. When we consider that the annual consumption of fuel in Hell Gate Brewery amounts to six thousand tons of Lehigh coal, we can readily understand that a waste of heat, in whatever form, must, in the long run, result in a very considerable pecuniary loss. In its downward course, from floor to floor, the water used for the purposes before mentioned, flows through pipes which empty into the tubs and boilers, and are supplied, at suitable points, with instruments for guaging quantities and determining temperature. By means of powerful steam-pumps, of which our vignette on page 84 presents a fair picture, the water is pumped from the Croton main into the vats, where it is heated as described. The vats on the floor next to the ground-floor furnish warm water for the cleaning of kegs. Thus, the water, too, passes through a series of connected pipes, vats, tubes and tuns, up and down the entire height of the building, serving a different purpose at every stage, and forming another circle within a circle.



SECTIONAL VIEW OF REFRIGERATOR BUILDING

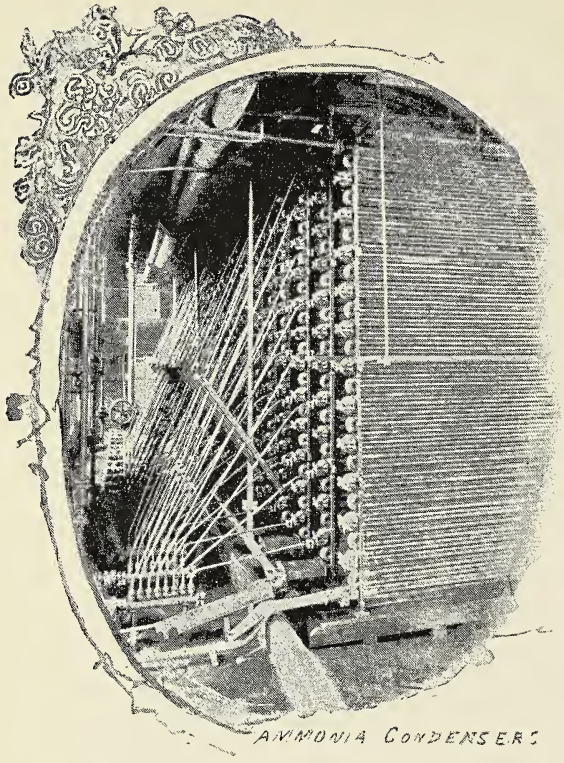
The refrigerating plant, of which we present illustrations on pages 69 and 73, is located in a separate building fronting on 93rd Street and adjoining the west wing of the main building. When Mr. Ehret determined to adopt the modern system of cooling his cellars, he did not at once abandon the old way, but continued to use ice to a large extent, so as not to be dependent upon the machine, which had not yet been fully tested; nevertheless, his confidence in the new method was so great that in erecting the refrigerating building, he provided room for a plant of sufficient capacity to supply all his needs. The building rests upon a massive foundation; it has three floors, including the ground floor, and covers twelve thousand five hundred square feet of the brewery premises. The system of cooling rests upon the principles first applied to this purpose, in 1849, by Gorrie, but has been improved upon during the successive stages of its development to an extent far exceeding the progress of any other scientific discovery. As applied in Hell Gate Brewery, the system performs its functions by means of the *direct* expansion of ammonia in iron pipes, placed under the ceilings and on the walls of the cellars; a far more effective and economical method, than the system by which the brine, after being cooled in large tanks, is forced through the cooling pipes by means of steam pumps. The plant consists of three De La Vergne machines—to which a fourth is soon to be added—each of an ice-melting capacity of 310 tons; these cool about forty cellars, or an aggregate space of 1,750,000 cubic feet, and furnish, in addition to this, all the ice-cold water required for the attemperators in the fermenting tuns, and for the coolers over which the wort passes when it leaves the cooling-tank, as explained. To describe the



REFRIGERATING MACHINE.

intricate process of cooling is a difficult task, save on the assumption that the reader fully understands the principles upon which the system is based. We must take it for granted that the reader knows that the rapid expansion of a compressed gas, as well as the volatilization of some liquids, is invariably followed by a lowering of the temperature, and that by a proper utilization of this change of temperature intense cold, to almost any degree below the freezing point, may be produced at will. The machines invented for this purpose vary considerably, both in effectiveness and cost, and in almost every country a different system is in vogue. The best American machines appear to be compounds of all the virtues and advantages of the most approved systems now in use; and it is claimed that the De La Vergne refrigerator yields to none in any respect. The principle parts of this apparatus are the boilers, expansion cocks, refrigerating coils, compressors, separating tank and ammonia condensers. The boilers are placed on the ground-floor, the machines on the next, and the condensers on the top-floor. Like every other material or agent we have thus far described, the ammonia, too, passes through a number of variously connected circuits, down into tiers upon tiers of cellars, and up again through the three floors above ground, only to recommence the same journey and repeat it again and again for the self-same purpose. The ammonia first goes in a liquid state into the cellar, where it is distributed by means of expansion cocks into the refrigerating coils; thence the three ma-

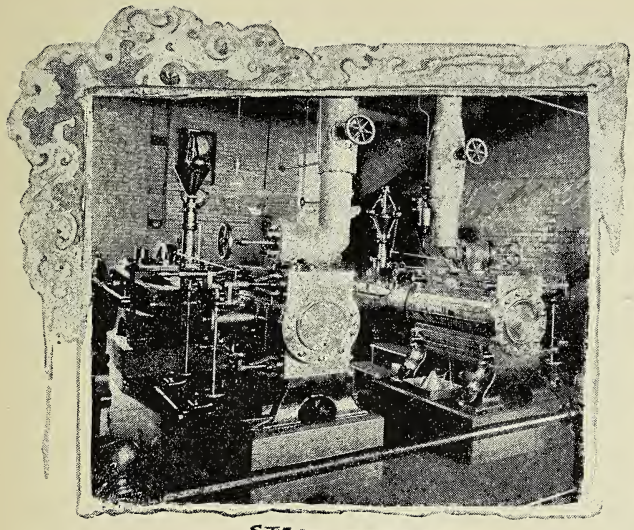
STABLES OF HELL GATE BREWERY.



AMMONIA CONDENSERS

chines draw it up in a gaseous state and compress it. From the compressors, it passes into a separating tank, and here the oil is eliminated and sent to the oil-cooler, while the ammonia, still in a gaseous state, ascends to the ammonia condensers on the top-floor of the building. By the use of salt water on the outside of these condensers, the ammonia is re-liquified, and in this liquid state again descends to the cellars, as before described. Still another circle within a greater circle! A recapitulation of the functions of this refrigerating plant may not be out of place. It cools 1,750,000 cubic feet of space in cellars; supplies ice-cold water for the attemperators in fermenting tuns and reduces the temperature of the wort, as it passes over the cooling pipes, to 40° Fahrenheit. During the summer months the beer to be cooled, in the latter manner, amounts on an average to two thousand barrels, daily—the maximum daily brew being twenty-seven hundred barrels.

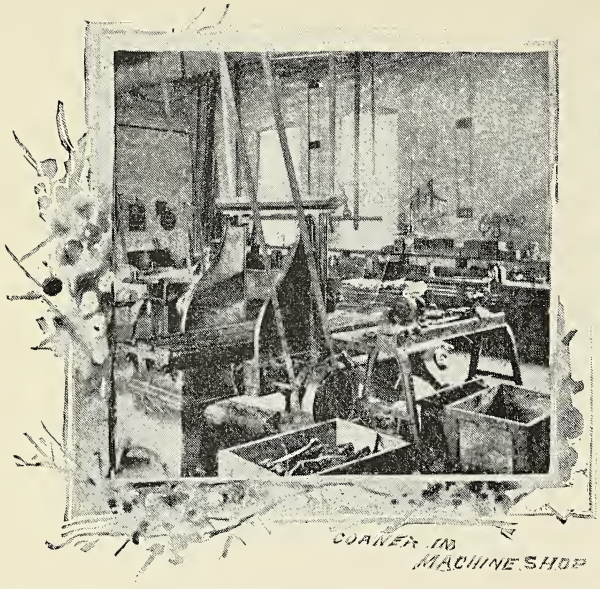
The steam required in Hell Gate Brewery for all the operations already described, and others still to be spoken of, is generated by eight colossal boilers, each five and a half feet in diameter, and containing fifty-six four-inch tubes. They are of the horizontal return tubular type, fitted with patent furnaces and water arches; and rated at 130 horse-power, each. (See illustration on page 77.) This boiler plant is really of double the capacity needed, and, hence, only one-half of the number of boilers is alternately in use, the other half being provided as a reserve in case of emergencies. The steam generated in these boilers drives fourteen engines. Of these, one is used in the machine



STEAM ENGINES IN BREWERY

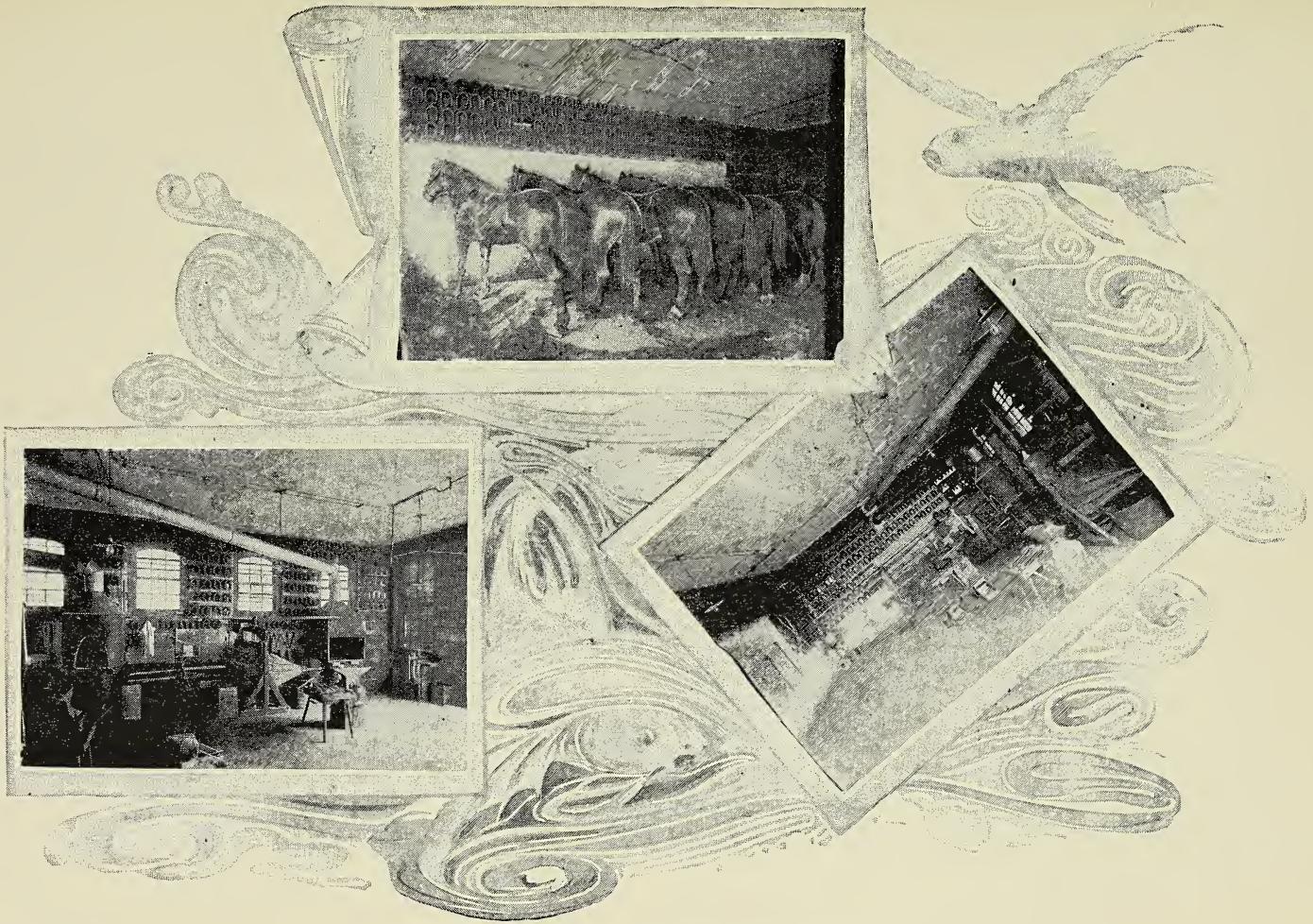
shop; three serve the purposes of the refrigerating plant; two are used for the electric-light plant; three, varying from 100 to 165 horse-power, set in motion the mashing apparatus, the malt-mill, malt elevators, keg-washing machines, rotary pumps in cellar, two Otis belt elevators and four keg elevators. Two of the latter are used for lowering empty kegs into the cellar, and the other two, for raising filled kegs. In addition to these, there are four more engines, one each for driving a feed-grinder and fodder-cutter in the stables, a set of revolving and suspended fans in the office, the cask-rollers in the pitch-yard and the machine for washing chips. We have already mentioned the great variety of pumps used in the brewery and at the pumping station on the East River, and, also, the two powerful duplex pumps, each capable of drawing, daily, 50,000 gallons of water from the artesian well.

All these steam motors, as well as the refrigerating machines, are connected with that system of steam condensation to which we referred in describing the partial heating of brew-water by means of exhaust-steam. Previous to condensation the exhaust-steam passes from the engine through an apparatus, called grease extractor, which eliminates the oil; it is then conveyed to a Gannon surface condenser and thence returned to the boilers. In this process of condensation a vacuum of from twenty-five to twenty-six inches is produced by means of an air-pump. The immense quantity of salt water used daily for the condensers of ammonia are so profitably utilized in this manner, that condensation is effected without an extra supply of water—an achievement which was deemed impossible by a number of machine-builders,

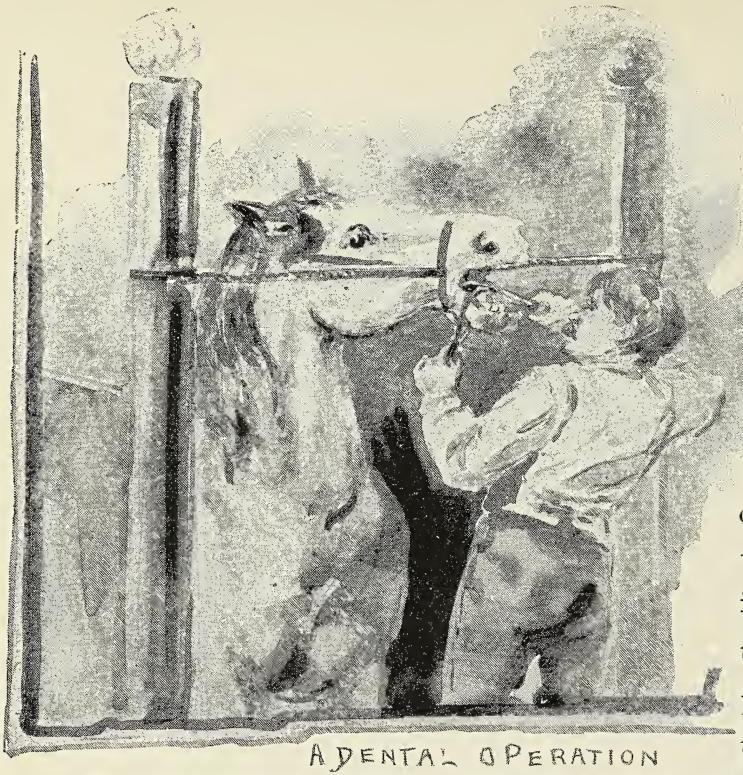


who volunteered to advise the chief-engineer of Hell Gate Brewery at the time the apparatus was introduced. As has been said before, a considerable quantity of fuel is saved by this system of condensation, throughout the year; and the money thus saved, amounts to a respectable sum, as may be seen from a simple arithmetical operation. Hell Gate Brewery produced, during the past year, 412,851 barrels of beer and consumed 6,000 tons of coal; hence, one ton of coal was required for the production of about sixty-nine barrels of beer, a quantity far exceeding that which can be produced, under similar conditions, without steam condensers. (Illustration of Engines, page 81.)

The force of employees required for the proper operation and maintenance of this multitude of engines, pumps, and machines, consists of one chief engineer, six licensed engineers, five assistant engineers, and fifteen helpers. All repairs rendered necessary by the inevitable "wear and tear," are attended to in a regular machine shop (see illustration on page 85), furnished with all requisite appointments and managed by two efficient machinists, capable of mounting machines and engines, and building any part thereof. As a rule, the necessity for repairs is anticipated by a regular overhauling of the engines and machines at stated periods—a precaution made all the more feasible because there are double sets of all parts of the machine-plant, so that if ever an entire set should break down, neither the principal work in the brewery, nor any accessory part thereof, would be interrupted for more than an hour. Each engineer and machinist submits to the chief periodical reports on the condition of the appliances under his charge; and these reports form the basis



HORSE-SHOE SHOP OF HELL GATE BREWERY.



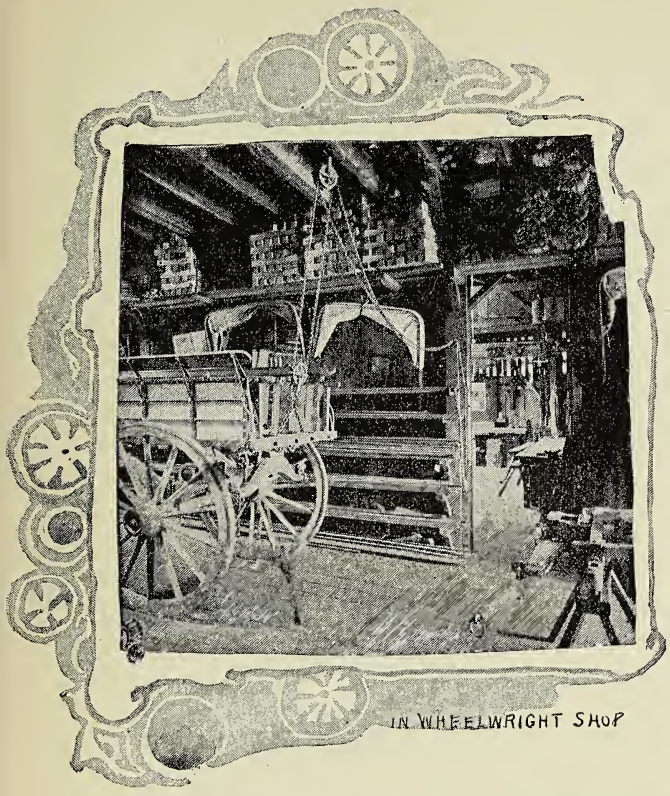
A DENTAL OPERATION

of a general statement, setting forth the kind and quantities of material required, from time to time, in the different departments. No loop-hole is left to chance or accident; everything works with clock-like precision and regularity. Of the brewery engines we present a group of illustrations on page 81.

In a separate room of the refrigerating building, we find the electric-light plant. It consists of two Edison dynamos, of a joint illuminating power of fourteen thousand candle lights, and supplies one thousand and twenty incandescent lights and sixteen double carbon arc lights. (See Illustration, page 113.)

HORSES AND WAGONS.

Retailers rarely ever lay in a stock of lager beer sufficient for more than a week; the majority of them must be supplied every other day. Usually, their places of business do not afford suitable cellar-room for storing large quantities of beer, and even if they did, the retailers would, nevertheless, prefer to see the brewer's wagon before their saloons at least twice a week. Hence, the greater the number of customers, the greater, also, the number of horses and wagons required for a brewery. One hundred and twenty-three wagons and two hundred and fifty exceptionally strong horses are used for this work in Hell Gate Brewery. Two stables, one of them the length of an entire block, afford comfortable quarters for the horses, and a small army of stablemen attend to the



IN WHEELWRIGHT SHOP

feeding, watering and cleaning of the faithful animals. An adherent of Mr. Bergh would be delighted to observe the care devoted in these stables to all conditions upon which depends the well-being of horses. We were at once impressed with the abundance of light and ventilation; proper temperature; the absence of manure and litter; excellent drainage; spacious and comfortable stalls, each supplied with uniform sheets, blankets, halters, etc., and the ample facilities for feeding and watering horses. Machines, driven by steam, grind the feed and cut the fodder, and supply a stream of clear water. The stables are under the care of a superintendent and a regular veterinary surgeon, whose duty it is to prevent the use of any horse who shows the slightest symptoms of disease. Usually, the condition of the horses is critically examined at least once a week, and special examinations of the hoofs of the animals occurs daily. During our visit we witnessed a sort of dental operation, which the surgeon declared to be indispensable to the well-being of the horses; it consists of the equalizing of the teeth to a uniform size by means of a rasp. A horse-shoeing establishment, with all modern appointments, forms part of this department; it is situated within the east-yard of the brewery, adjoining the upper stable, and affords room for a score of horses. (See page 93.)

The wagons of the brewery belong to this department, of which a wheelwright shop and a paint shop, both fully equipped, form valuable adjuncts. The wheelwright shop is particularly well appointed; it contains the best

machinery for building wagons, and is managed by a force of capable wheelwrights. A circular-saw, driven by steam, of which we caught a glimpse in the pitch yard, cuts the timber used in this establishment. (See Illustrations on pages 97 and 105.)

COOPERAGE.

COOPERAGE is no longer a handicraft in America; the inventive genius of our people, to which we owe the greater part of the progress that placed us at the head of civilized nations in point of machine-building, has virtually wiped out the cooper's handicraft, and given us, in its stead, a half dozen enormous manufacturing establishments, in which nearly all the barrels required by brewers and distillers are made by machine. There was a time when nearly every brewer had at least a smattering of the coopers' art, and when the cellar men, employed in breweries, had to produce satisfactory evidence of having passed through the regular course of training, prescribed for apprentices and journeymen by the ancient and honorable guild of coopers. Although this is now all changed, yet in so large an establishment as Hell Gate Brewery, the employment of a considerable force of coopers is indispensable. The large casks and vats, ranging in capacity from 50 to 800 barrels, which fill the cellars of the Ehret brewery, number about 1,500, and there are about 100,000 packages—*i. e.* barrels of thirty-one gallons, and half, quarter and sixth barrels—in constant use; and a considerable reserve stored away for emergencies. (See illustration on page 101.) The coopers employed in Hell Gate Brewery keep an accurate account of these packages

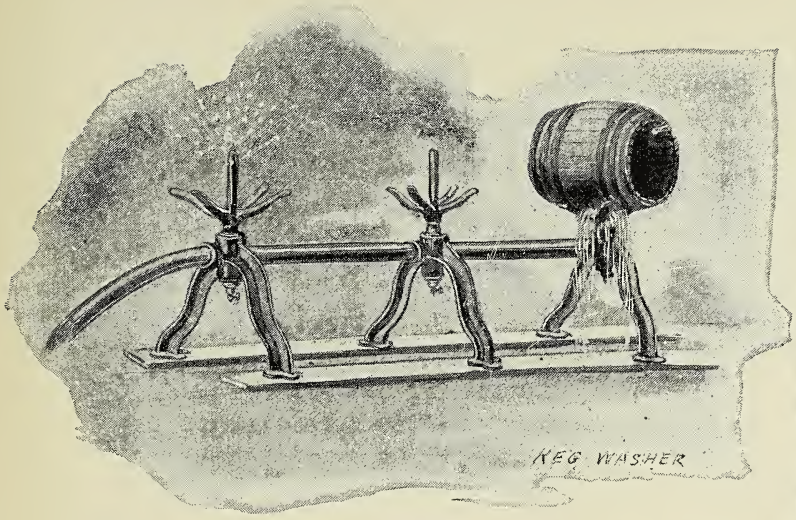
WHEELWRIGHT SHOP OF HELL GATE BREWERY.

GLIMPSE of PITCH YARD

and vessels, examine them from time to time, and make such repairs as their condition may require.

The pitching of barrels, which serves the two-fold purpose of facilitating the process of cleaning and of preventing the beer from acquiring a smell of the wood, is performed periodically, with such methodical regularity that not a single package can escape this fiery ordeal. The pitching yard, (see illustration on page 105), situated on the north side of 93d street, and enclosed by a wall, is the scene of this part of the cooper's task; here, too, manual labor forms only an adjunct to steam-power. Four large cask-rollers, and many smaller ones, all driven by a steam engine of ten-horse power, a pitch oven and a pitch cauldron take the place of the simple implements with which, in former days, the cooper used to perform this work. After the liquid pitch has been poured into the casks, the latter are placed upon the moving rollers and continually turned around; in this manner the pitch is evenly spread over the inner surface of the barrels and kegs.

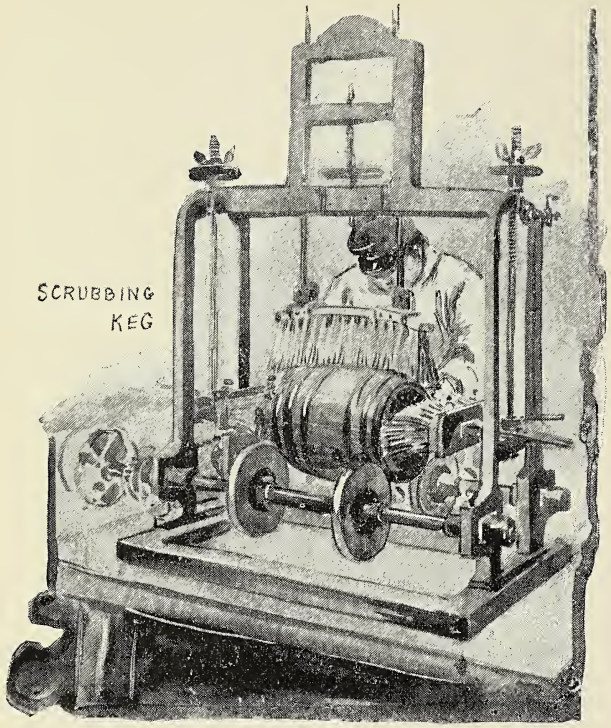
The manufacture of brewers' pitch yields a considerable income to an important industry, and is of no small benefit to the producers of the raw material. A number of substitutes for pitch have been offered in the market, and some of them, especially one made of the residuary substances obtained in the process of refining petroleum, possess many qualities lacking in pitch; but here the conservative spirit of the brewers prevails against innovation, for none of the substances have that peculiar, although exceedingly faint,



flavor for which the ordinary pitch is so highly prized by both the brewer and the drinker.

All kegs are washed as soon as they return from the retailer, and the importance which the brewer attaches to this part of his business may be inferred from the fact that no less than one hundred barrel-washing machines have been invented—a sure sign of pressing demand. The machines used for this purpose in Hell Gate Brewery are of the very latest pattern, and perform the work of washing and scrubbing with a thoroughness that leaves nothing to be desired. (See illustration, page 109.) The kegs are washed several times, and always with hot water, supplied, as we have already stated, from one of the vats on the floor above. They are washed both inside and outside. The operation is entirely automatic, all the man has to do, is to place the kegs over the contrivance, depicted in our vignette on this page, in such a way as to insert the perforated tubes into the bung-holes. The water rushes with great force through these tubes and strikes ever part of the barrel, and then flows off through the bung-hole into a trough, which forms part of the apparatus. Although the cleaning of the outside of the barrels is not essential, great care is, neverthless, bestowed upon this work, which is performed by scrubbing-machines. The latter seem to give much satisfaction, and are, therefore, in general use in all large breweries.

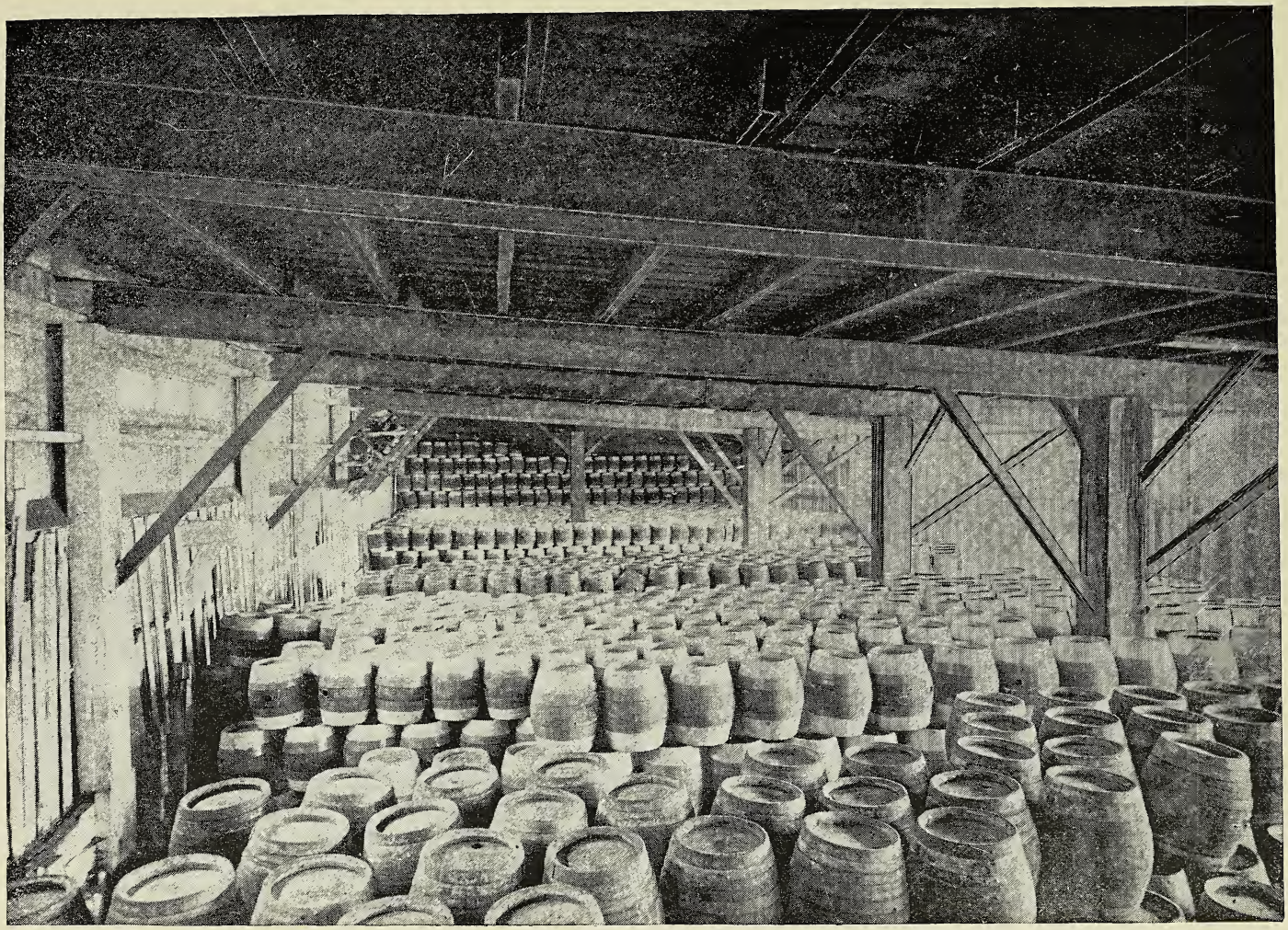
It is one of the characteristics of the American brewers to disregard expense, when the quality of their product is at stake, and can be enhanced by the use of modern appliances; in that case they give no thought to anything



SCRUBBING KEG

else; but when no such considerations prevail, they show a remarkably conservative spirit, and prefer to adhere to old methods, particularly when the use of modern inventions would necessitate a reduction of the number of workmen. Cleanliness being a principal condition of the keeping quality of the beer, the brewer devotes to it all the modern appliances he can secure. The wash-room, situated on the ground floor of the main building, has a cemented floor and is bordered with open gutters, which empty into the sewers. The men employed in it wear heavy boots, impervious to water, but are otherwise clad in the usual dress of the "Brauburschen." In the matter of dress, by the way, the spirit of our age has wrought many innovations; excepting the blue blouse, every article of dress that used to distinguish the brewer's guild from other handicrafts, has disappeared.

Although but indirectly connected with cooperage, the treatment of chips or shavings may as well be disposed of under this heading. As we have seen, beech shavings are used for the clarification of the beer while in the storage casks, where a second fermentation takes place. Before being so used, the chips undergo a thorough process of boiling and washing, which is accomplished by steam-driven machines (see illustration p. 105) of very modern origin. Under very favorable circumstances the chips serve this purpose more than once; but, when this is the case, they must again be subjected to boiling and

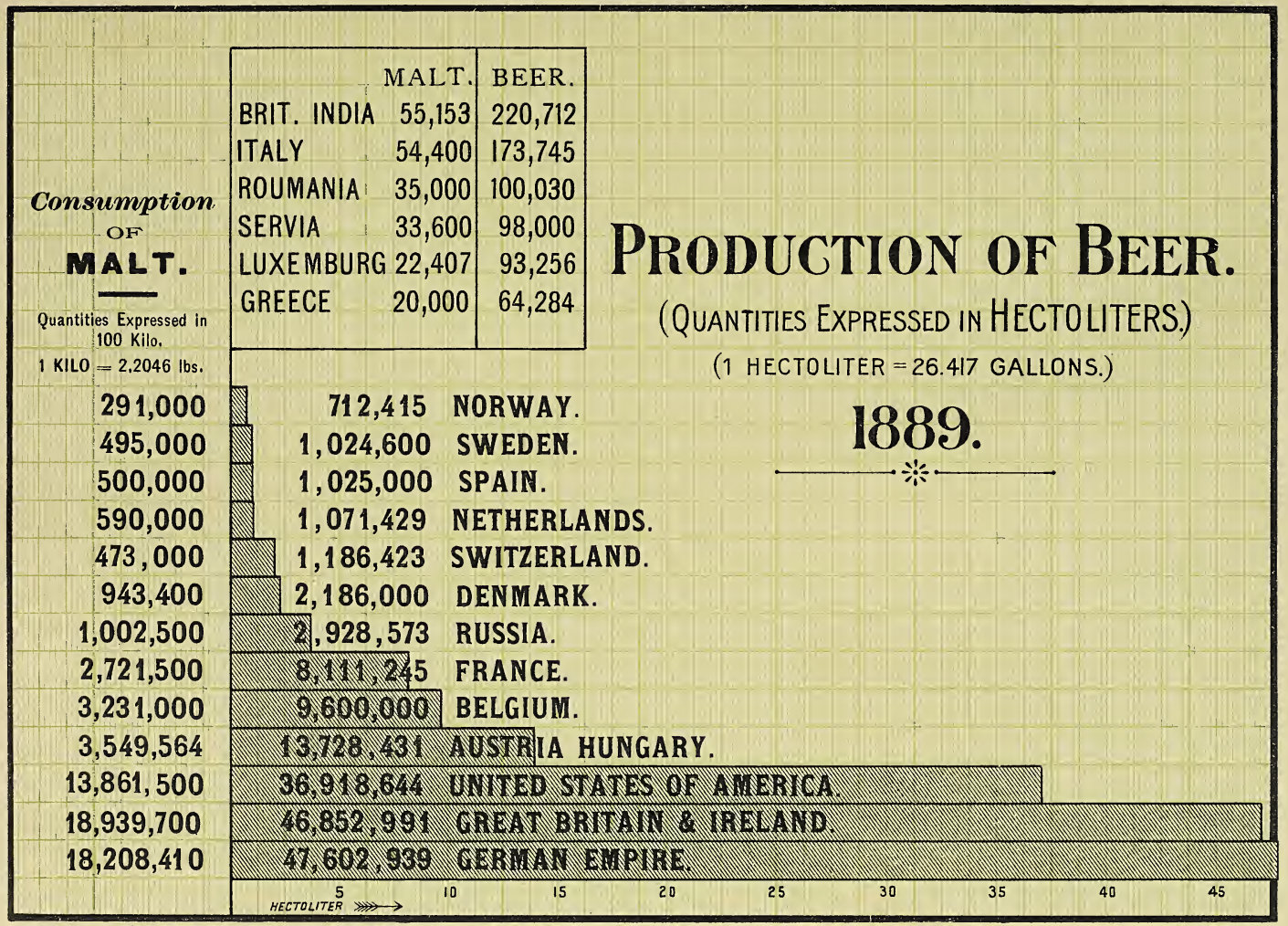


STORE ROOM FOR KEGS IN HELL GATE BREWERY.

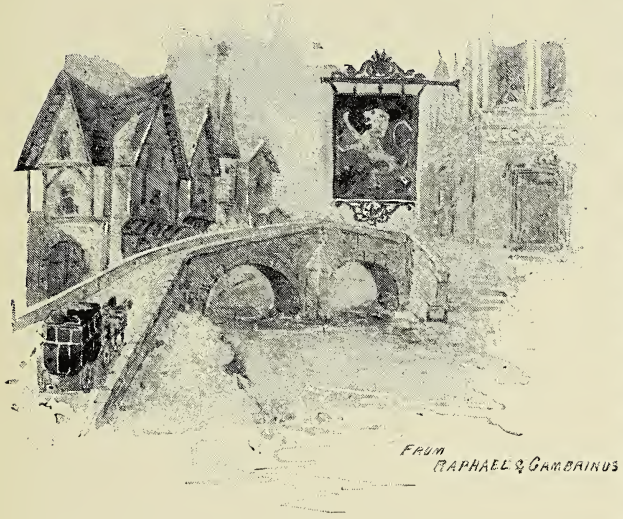
cleaning. In Hell Gate Brewery, beech chips are used exclusively. The stock on hand at the time of our visit was in keeping with the enormous quantities of raw material which filled the store-rooms.

In concluding this sketch of Hell Gate Brewery, a few words must be said concerning the position which the brewing industry occupies as one of the great wealth-producing factors of our nation, and the extent to which it contributes to the maintenance of other industries. It is impossible, of course, to search out all those branches of business which directly or indirectly depend upon brewing, but even an incomplete statement will serve to dispel many errors which have been fostered by the enemies of our product. We cannot even approximately estimate the amount of money paid annually by the brewers of this country to the masons, machine builders, pump manufacturers, coopers, lumber dealers, and the manufacturers of the many instruments and utensils used in brewing; nor can we fully determine the advantages which agriculture derives from our industry. Much less can we state, with any degree of accuracy, the help which other industries receive from the trade generally. But there are a few items which we can estimate roughly, at least. Thus, from statistical exhibits, officially published, it appears, that the brewers of this country pay, annually, for agricultural products about $120,000,000. The capital invested in breweries, of which 80 per cent. represents cost of buildings and machineries, is estimated at $300,000,000. These figures alone suffice to demonstrate the economic short-sightedness of those persons who advocate the annihilation of the brewing industry.

The extent to which brewers contributed towards the payment of the national debt, caused by the war of the rebellion, is eloquently expressed by the annual reports of the Internal Revenue Department. Since 1863 and up to 1889, no less than $295,311,185 have been paid into the United States Treasury by the brewers of this country. The Federal taxes paid by Hell Gate Brewery from 1871 to 1890 amount to $4,495,325.


Consumption OF MALT.
Quantities Expressed in 100 Kilo.
1 KILO = 2.2046 lbs.
MALT. BEER.
BRIT. INDIA 55,153 220,712
ITALY 54,400 173,745
ROUMANIA 35,000 100,030
SERVIA 33,600 98,000
LUXEMBURG 22,407 93,256
GREECE 20,000 64,284
PRODUCTION OF BEER.
(QUANTITIES EXPRESSED IN HECTOLITERS.)
(1 HECTOLITER = 26.417 GALLONS.)
1889.
291,000 712,415 NORWAY.
495,000 1,024,600 SWEDEN.
500,000 1,025,000 SPAIN.
590,000 1,071,429 NETHERLANDS.
473,000 1,186,423 SWITZERLAND.
943,400 2,186,000 DENMARK.
1,002,500 2,928,573 RUSSIA.
2,721,500 8,111,245 FRANCE.
3,231,000 9,600,000 BELGIUM.
3,549,564 13,728,431 AUSTRIA HUNGARY.
13,861,500 36,918,644 UNITED STATES OF AMERICA.
18,939,700 46,852,991 GREAT BRITAIN & IRELAND.
18,208,410 47,602,939 GERMAN EMPIRE.
5 10 15 20 25 30 35 40 45
HECTOLITER

CONSUMPTION OF BEER, HOPS AND MALT.



AS it is our intention to make this a sort of book of reference on the subject of brewing, we must not omit mention of the consumption of beer throughout the civilized world, and of the production and consumption of the raw material of which beer is made. Inquiries concerning these points are made every day, and in but very rare instances can the information desired be given by those of whom it is asked. Ready reference being essential in such matters, we have prepared diagrams showing the *per capita* consumption of malt-liquors in every country where beer is used; also the production and consumption of hops and malt.

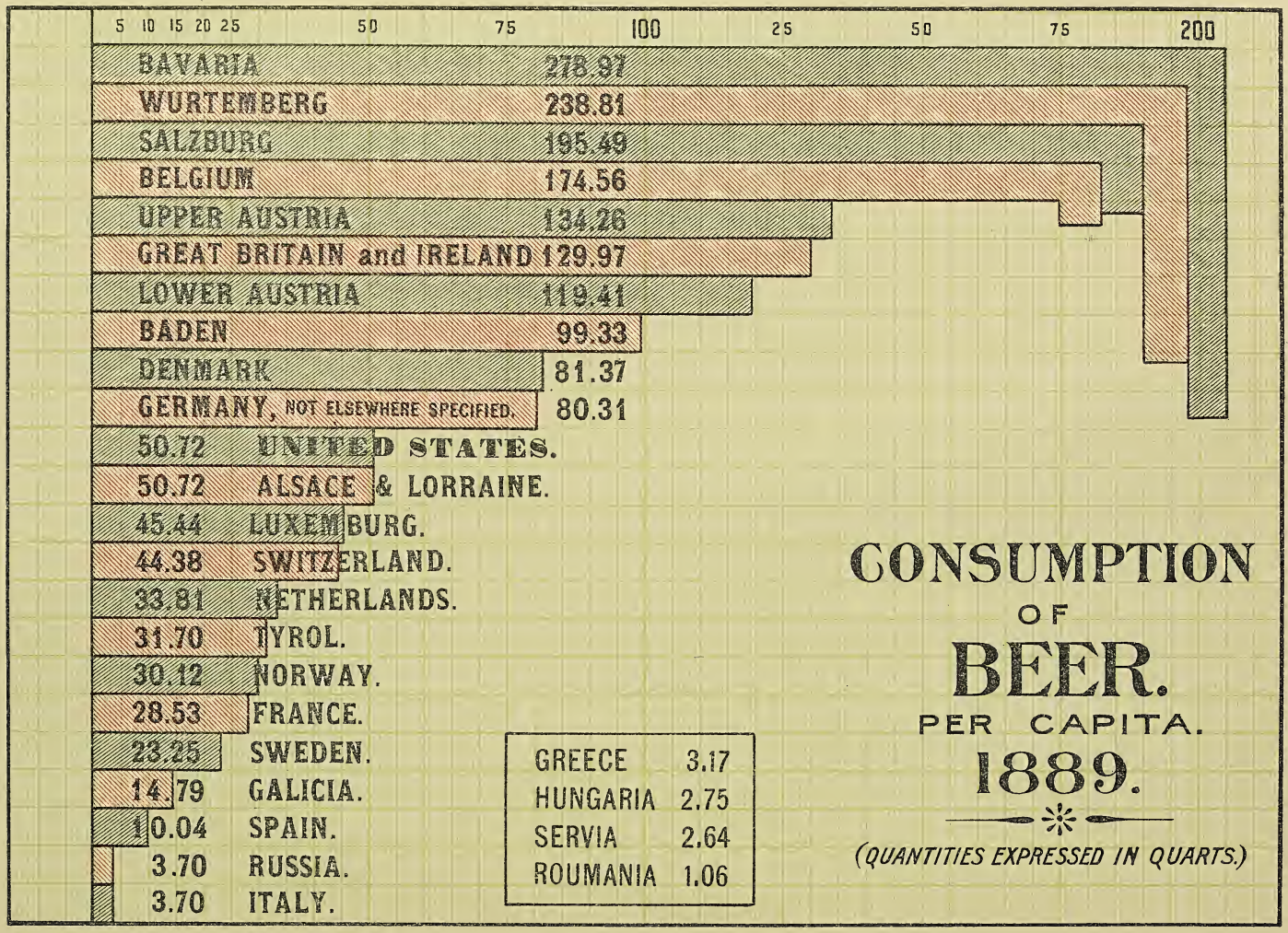
The consumption of malt-liquors, *per capita*, is greatest in Bavaria and Würtemberg; it is greater in Upper-Austria, Salzburg and Belgium than in Great Britain; but it is greater in England than in the German Empire, including Bavaria and Würtemberg; it is lower in the United States than in any of the countries named, and in many others inscribed upon our diagram. But if, instead of considering the consumption *per capita*, we look at the aggregate production and consumption by countries, ignoring geographical and political sub-divisions, we find that the United States, in 1889, ranked third in the list of beer-producing lands, the only two States ahead of our country being Germany and Great Britain, and the difference in favor of the latter, about 10,000,000 hectoliters. The uncommon increase of the past year will greatly diminish this difference. If we base our calculations upon the greatest beer–

ALSATIAN BREWERY. (RAPHAEL'S GAMBRINUS)

producing States and their population, in the same manner as we have selected Bavaria and Würtemberg from among the German States, we find that in at least two States of the Union the *per capita* consumption of malt liquors is greater than in Great Britain. If we take the revenue figures for 1890; assume that the population of the State of New York in that year was 6,500,000, and then deduct from the total quantity produced one-fourth, as being the part shipped to other States, we find that the *per capita* consumption in that State was 124 quarts.

Within the quarter-century which has elapsed since the existence of Hell Gate Brewery, the phenomenal growth of brewing throughout the world gave rise to many speculations as to the future of malt-liquors, and many very able writers do not hesitate to call beer the universal drink of the future. Formerly confined to about four great States, the use of malt-liquors is now known in every civilized land; and even in Southern countries, where the grape-vine abounds, beer is gradually superceding every other beverage. In France, a wine-country without equal, the most eminent scientists advocate the use of beer in preference to any other liquor. After the Franco-Prussian War, special freight trains, loaded exclusively with Bavarian beer, and, therefore, styled "trains de biére," brought, daily, about three hundred thousand gallons of the drink to Paris. But when the spirit of vengeance against the Germans got the upper-hand, the imported beer was "boycotted," and, as a result, a great number of domestic breweries were erected, generally by Alsatians. Spain, Italy, and even China and Japan are now being invaded by King Gambrinus, and it is, indeed, only a question of time whether beer shall be, as prophesied, the universal drink.

The literature, in languages other than English and German, on the sub-

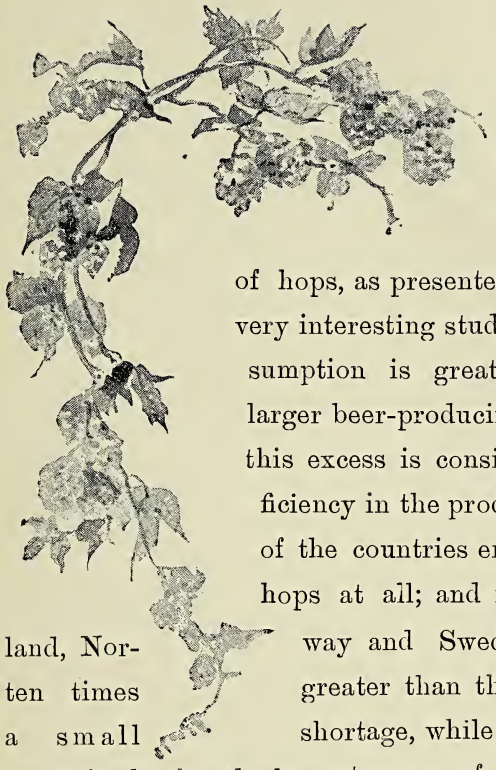

5 10 15 20 25 50 75 100 25 50 75 200
BAVARIA 278.97
WURTEMBERG 238.81
SALZBURG 195.49
BELGIUM 174.56
UPPER AUSTRIA 134.26
GREAT BRITAIN and IRELAND 129.97
LOWER AUSTRIA 119.41
BADEN 99.33
DENMARK 81.37
GERMANY, NOT ELSEWHERE SPECIFIED. 80.31
50.72 UNITED STATES.
50.72 ALSACE & LORRAINE.
45.44 LUXEMBURG.
44.38 SWITZERLAND.
33.81 NETHERLANDS.
31.70 TYROL.
30.12 NORWAY.
28.53 FRANCE.
23.25 SWEDEN.
14.79 GALICIA.
10.04 SPAIN.
3.70 RUSSIA.
3.70 ITALY.
GREECE 3.17
HUNGARIA 2.75
SERVIA 2.64
ROUMANIA 1.06
CONSUMPTION
OF
BEER.
PER CAPITA.
1889.
(QUANTITIES EXPRESSED IN QUARTS.)

PITCH YARD, PAINT SHOP AND SHAVINGS WASHER.

FROM "RAPHAEL & GAMBRINUS"

ect of beer, proves conclusively that the best minds regard it as a worthy undertaking to write on a question which materially affects the welfare of the people. The celebrated Professor Pasteur has written a voluminous work on the chemistry of brewing, and in many fugitive essays expressed himself strongly in favor of the use of beer, as a means of rendering his people strong and healthy. The best work on "art in breweries and taverns" is by a Frenchman. From his "Raphael and Gambrinus" we present a few illustrations. A characteristic beer story is told of a band of young heathens, whom the Japanese Government sent to Germany to learn the art of brewing, which has since been introduced into that country. When the young men returned, muscular yet rotund, with a healthy glow upon their cheeks, and elasticity and strength in all their movements, the ministers were so strongly impressed with the vitalizing effects of beer, that they ordered a merchantman to proceed to Germany, load up with beer, and return post-haste to Japan. The result of this expedition is said to have accelerated the establishment of the first brewery in the Mikado's realm.

The most remarkable part of this progress of brewing is, that in many instances, as, for example, in France, it was effected in spite of popular clamor against the Teutonic drink; and still more remarkable is it that those who began by opposing its use most bitterly, ended by advocating it most fervently. The best evidence of the favor which beer has gained among the art-loving people of France, lies in the lavish embellishment of the exterior and interior of the French breweries, in which beer is retailed for consumption on



the premises. The most superficial observer must discover at once that such costly appeals to the artistic taste presuppose a fashionable and profitable patronage.

The production and consumption of hops, as presented on our diagram, offers material for a very interesting study. The excess of production over consumption is greatest in Germany; in nearly all the larger beer-producing countries, excepting Great Britain, this excess is considerable, and goes to make up the deficiency in the production of countries less favored. Seven of the countries enumerated in the diagram, produce no hops at all; and in the Netherlands, Denmark, Switzerland, Norway and Sweden the home consumption is nearly ten times greater than the production. Great Britain shows a small shortage, while the United States are among the three countries having the largest excess of production over consumption.

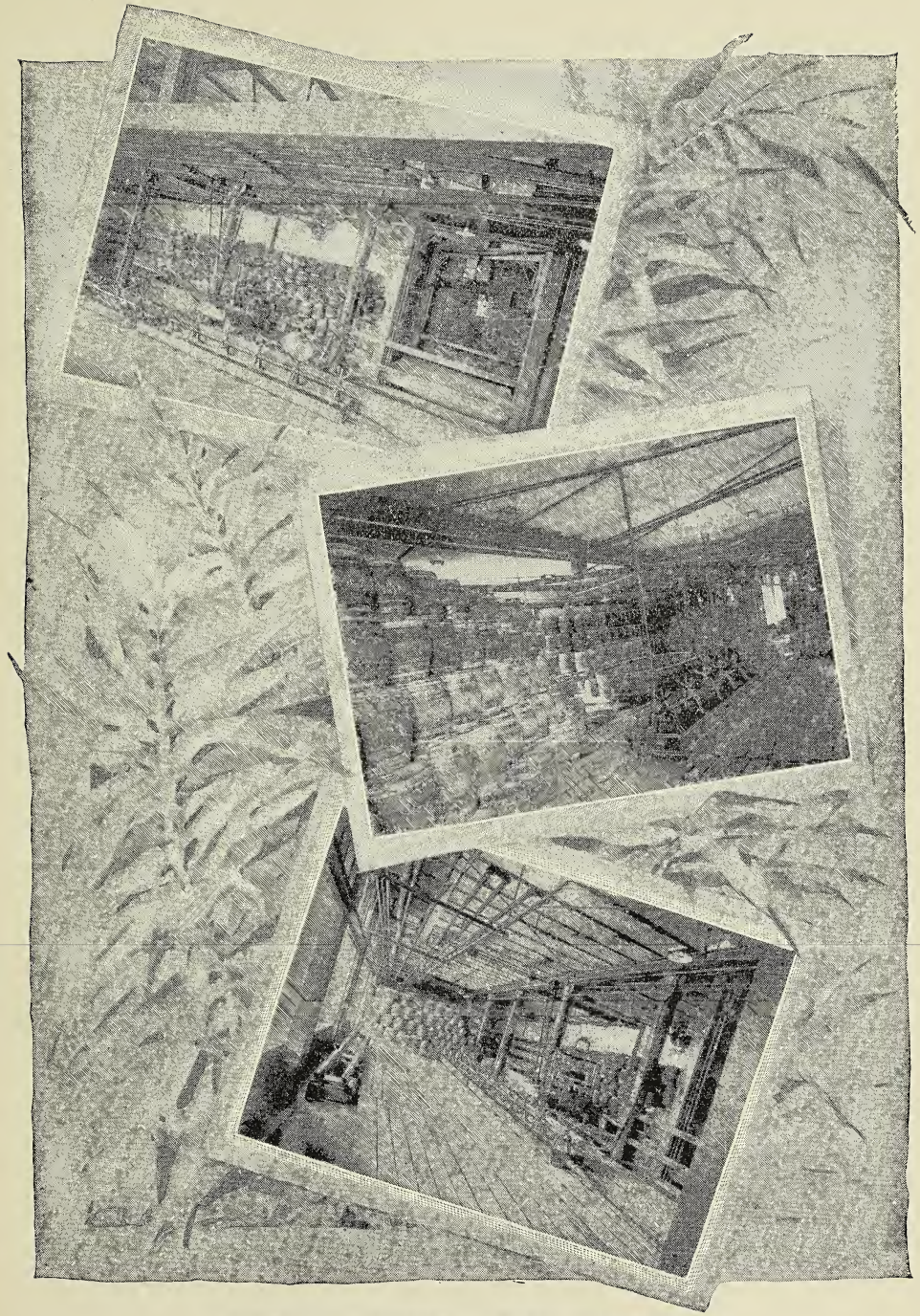
American hop-culture has a great future, in spite of the fact that it is confined to but few States, as hops will not grow profitably everywhere. The climate forbids the profitable growth of hops in all sections of the United States south of the latitude of New York City, Cincinnati, and St. Louis. In the Southern climate the hops run too much to vine, and the fruit fails of its full development. The hop is a Northern plant, and as far north as Manitoba grows wild and in great profusion. On the other hand, not every soil will produce the hop in perfection.

The rich prairie lands of Indiana, Illinois, Iowa, and Minnesota are not favorable to hops, although the climate is propitious. These soils lack something that is essential to the full development of the lupuline. The sections where both soil and climate favor the cultivation of hops are the central and

northern counties of New York; here we have a cool climate and a rich soil, full of all the elements that go to make fine hops; Washington and Oregon, with a cool climate, and a soil so deep and rich and virginal that the yield of hops is exceptionally good, both in quantity and quality; and, lastly, California, where the hops are raised mostly in the valleys of the Sacramento and Russian rivers.

Twenty-five years ago Wisconsin raised a crop of about 10,000 bales of hops, but the hop-louse suddenly cut off the crop, and now, in 1891, not more than 2,000 bales are raised per year in that State. A few hops are raised each year in the New England States, where the soil is generally too poor to make the yield profitable, and a few in Michigan.

A hop-yard is planted by means of cuttings or "sets," taken from the roots of old vines, and set in the ground about seven feet apart each way, so that there are about 750 hills of hops to an acre. In New York State the vines from these "sets" produce nothing in the first year of growth, being allowed to spread on the ground; about half a crop in the second year, and a full crop in the third year. In California, Oregon and Washington the "sets" are furnished with poles the first year, and produce that year about half a crop, and a full crop the second year. In New York a fair average crop is about one pound of cured hops to the hill, or 750 pounds to the acre; while on the Pacific coast two or three, and, not infrequently, four times that weight is



KEG-WASHING APPARATUS IN HELL GATE BREWERY.

harvested. The hop-yards are generally equipped with poles about fifteen feet high, upon which the vines grow spirally upward; sometimes, however, the hop-vines are trained upon wires, stretched horizontally between stout posts over the rows of hills, with smaller wires or strings leading up to the horizontal wires from each hill.

Some hop-yards are furnished with a single pole to a hill, the poles being from twelve to eighteen feet high, with strings running obliquely upward from the middle of one pole to the top of its neighbor. The prettiest hop-yard—that is the one most beautiful at the time of harvest—is the "tent-yard," where a straight pole, twenty feet high, is set in the center of six or seven hills, into which stakes about five feet high are placed, and provided with strings leading to the top of the tall central pole, thus forming a regular tent. These tent-yards closely resemble a military camp, a fact which gave rise to the designation, "Camps of King Gambrinus."

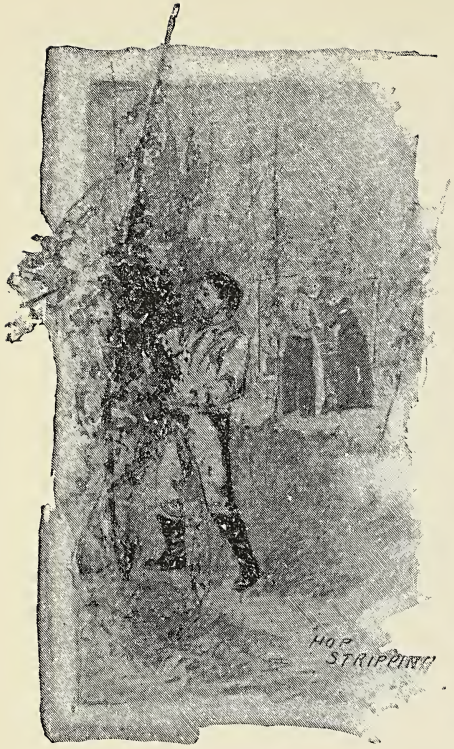
In California, in former years, the hops were largely picked by Chinamen, but since the labor movement, which culminated in the exclusion of Chinese immigration, has brought the employment of such labor into disfavor, the

HOP PICKING IN OREGON

majority of planters hire other help, and Chinamen are now but rarely seen in the hop-yards.

In Washington, and to some extent also in Oregon, the hops are mostly picked by Indians from British Columbia. They cross Puget Sound in their canoes, bringing all their women and children and all their household goods along, and go into camp on the borders of the hop-yards, about the 1st of September of every year. They board and lodge themselves, and always work "by the piece," that is to say, they get a fixed compensation for every box of hops picked by them. All the Indians have to do, is to pick the hops from the vine, and they "pick for all they are worth," most literally; for, every cent they earn, for the whole year in most cases, is earned in the three or four weeks of the hop-harvest. Every squaw and papoose picks, from early morning until night, into baskets or shawls, which are emptied into the box and help to swell the family's income for the year. Before the introduction of hops into Washington, about twenty-five years ago, these Indians did not earn a dollar in money in a year, but now, at the close of the hop-harvest, a single Indian family, composed of man, wife, and usually several children will carry home with them one hundred dollars in cash. The difference to that poor family, in comfort and civilization, can easily be understood.

We now come to the hop-harvest in the State of New York, and here it is in its glory. The great counties of Otsego, Schoharie, Montgomery, Herkimer, Oneida, Madison, Onondaga and Ontario lie along, and mostly a little



south of, the Erie Canal and the New York Central Railroad, between Albany and Rochester, a belt two hundred miles long, and fifty miles wide. Franklin and Lewis counties, along the Canadian frontier of New York, have a considerable hop interest but for our present purpose we shall confine ourselves to the region situated in the belt we have mentioned, bounded by Albany on the East, and Rochester on the West, and dotted, along its whole length of two hundred miles, with the cities of Albany, Schenectady, Amsterdam, Utica, Rome, Syracuse, Auburn and Rochester. Towns and villages of from one to two and three thousand inhabitants, many of them manufacturing towns, and all of them full of women and children willing to work and eager to rusticate for a time, are scattered all over the hop-belt; and from this long line of populous cities, and these thickly settled towns and villages, come the pickers for the hop-harvest. On or about the first day of September, they come with a rush, and usually find a demand equal to the supply. For weeks the hop-grower's good wife has been preparing for them; beds, rough, but comfortable and clean, are set up in every building on the farm—in the house for the women and children, and in the outbuildings (sometimes put up for the purpose), for the men and boys. Bread is baked by the barrel; "doughnuts" are fried by the bushel. The farmer has already engaged his pickers in the neighboring cities or villages, and, on the appointed day, in they come, some by wagons, sent out the day before to the city, often twenty miles away, some by special railroad trains, chartered for the purpose, and some on foot. Whole families are in the crowd, father, mother and all the children, from the

ELECTRIC LIGHT PLANT IN HELL GATE BREWERY.

HOP CONE

active boy or girl of fifteen years, who can pick two or three boxes, and earn a dollar a day, down to the baby whom the mother takes out into the field, and watches while she picks her box, and earns its clothing for the coming winter.

These families are frequently those of hard-working mechanics in the cities, who are glad to give their wives and children an outing in the fresh air for three or four weeks, and find them all the richer and happier by reason of the escape from the stony and dirty streets of their urban home. It is a picnic for the children; and their pranks, when they first arrive, are a sore trial to the steady farmer and his wife. But after the first day's work (from six in the morning until twelve at noon, and from 12.30 P. M. until six at night) is over, they are well sobered down for bed, and their surplus energies are thereafter turned into the channel that leads to the hop-box in the morning, and to bed at night. Many a poor factory girl finds in the hop-fields the only fresh country air she breathes in the whole year; and while she is laying in the year's stock of health, her nimble fingers are bringing to her more money than the work in the stiffling mill.

The happy crowd of workers from the distant cities and towns, are what are known in the hop-regions as "foreign pickers," and are so called in contradistinction to the "home-pickers." The "home-pickers" are those who live in the immediate neighborhood of the hop-yards where they pick. They board at home during the harvest, and are carried to and from the hop-yard by the hop-grower, who builds a seat on each side of his farm wagon, lengthwise, so that fifteen or twenty can ride at a time. As these pickers board

themselves, they are paid a higher price per box. In those villages in the hop section which are surrounded by hop-yards, every inmate of the farmhouse takes part in the work of harvesting. No hired girl can be kept in the kitchen; she regards an outing in the hop-field as one of the perquisites and emoluments of her office. Few daughters of the family can be kept in the parlor. They are off early, clad in their old dresses and sun-bonnets, and come back in the wagon at night, tired and hungry and sleepy.

To the hop-grower, the harvest, by reason of high prices for hops, is sometimes very profitable. Sometimes, by reason of low prices, it is very unsatisfactory. But to the poor families in the surrounding towns and villages it is always a blessing; for, no matter whether the price of hops be high or low, the compensation for picking is always the same. Let us see how it foots up. The hop-crop of the United States amounts to about 200,000 bales, of 180 pounds each. It takes fifteen boxes for a bale, and for each box the picker is paid about fifty cents cash, or its equivalent in cash and board. Fifteen boxes at fifty cents each makes $7.50; hence, for 200,000 bales the pickers receive about fifteen hundred thousand dollars.

Although any cereal artificially germinated is termed malt, yet, for various reasons, malt made from barley is meant when no other designation save this general term is given. In past ages, wheat, corn and oats were used in brewing quite as frequently as barley, and there are many statutory evidences,

IN BARLEY FIELD

showing that the governments of the various beer-producing countries forbade the malting of any grain the production of which was insufficient to supply the necessary food for the people. The very first beer brewed in New York by the Dutch colonists, was made of oats, there being an abundance of that grain on Manhattan Island. The Puritans of New England, on the other hand, seem to have malted wheat in great quantities, as appears from an order of the General Court of Massachusetts Bay, forbidding the use of that grain, but permitting the malting of oats or other cereals. At the present time the use of barley is pretty general. The quantity of barley produced throughout the world eludes exact computation, however, because this grain is grown in every zone and in many semi-barbarous countries, where the collection of agricultural statistics is unknown. In regard to hops, the case is different, for that plant is cultivated exclusively for use in breweries, and its cultivation moves within clearly defined geographical limits. Barley serves largely as food; in some countries bread is made of it, to the almost entire exclusion of other grain, and its use in cookery prevails in all countries.

In view of these facts we can only take into consideration the consumption of barley in the form of malt. The data here offered will be better

CONSUMPTION & PRODUCTION OF HOPS.

(QUANTITIES EXPRESSED IN 50 KILO.)

50 KILO. = 110.23 LBS.

CONSUMPTION.		PRODUCTION.
		3,000 Denmark.
	14,000	
		5,000 Netherlands.
	15,000	
		34,000 Russia.
	25,000	
		68,000 France.
	70,000	
		110,000 Belgium.
	77,000	
		152,050 Austria Hungary.
	102,800	
		430,000 U. S. of America
	300,000	
		643,900 German Empire
	385,000	
		520,000 Great Britain & Ireland
	580,000	

SPAIN,	13,500
SWEDEN,	7,000
SWITZERLAND	5,000
NORWAY,	3,500
ROUMANIA,	2,000
SERVIA,	1,736
ITALY,	1,500
BR. INDIA.	1,400
GREECE,	900
LUXEMBURG,	750

SWITZERLAND	700
SWEDEN AND NORWAY	600

55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55

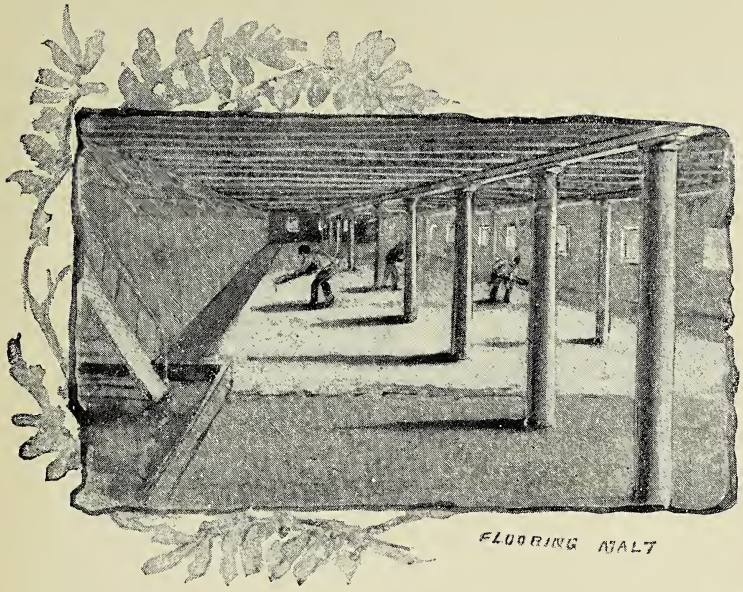
understood, if it be borne in mind that all light beers of that peculiarly vinous taste, which has of late become somewhat popular, are madeof malt and rice or corn, as in the case of the excellent Pilsen brands. The prevailing taste, however, still calls for a brewage of a deep reddish-brown color, peculiar to heavily-malted beers, such as emanate from Hell Gate Brewery. This question may as well be dropped, it being one of taste, about which, according to an old proverb, there can be no conclusive arguments.

The production of barley in the United States expands continually, and the recent increase of the protective duty on the foreign product—pointedly aimed at the Canadian barley—will doubtless give additional impetus to this growth. Necessarily, the business of malting kept pace with the rapid development of brewing, and one of the inevitable results of the suddenly enlarged demands was the establishment of many separate malt-houses, fitted up with all modern improvements. This progress, in turn, led, in a very large measure, to the discontinuance of malting by brewers. At the present time, a comparatively small number of brewers malt their own barley, it being more profitable and, usually, more satisfactory to draw on the maltster for the requisite supplies.

Concerning the manufacture of malt, we have already said what might appear to be of interest to the reader. The successful pursuit of it, requires not only great skill in the handling of the grain while undergoing the inter-

BARLEY SHEAF

esting process of artificial germination, but also much experience and practice in the selection of the material. There are many species of barley, distinguished from each other by, and named according to, the number of rows which form the ear; thus we have two-rowed, four-rowed and six-rowed barley. Of these, and other species, a number of varieties exist, and the quality of all varies very materially, according to the character of the soil. In making his purchases the maltster must be able, of course, to determine whether the grain is of the kind that will yield good beer. Sight, touch and taste aid him in this, and enable him to make sure that the grain is fully ripe, of the last harvest, not too hard and smooth, nor excessively husky; but whether it contains the nitrogenous compounds, starch, salts, etc., in the desirable proportions, he is unable to determine, unless he knows the soil where the barley grew and has tested its qualities before. Given good raw material, the maltster's success depends upon his care and vigilance in preparing for, continuing and interrupting germination at the proper time, and in judiciously handling the grain after these stages. The process begins with steeping and ends with kiln-drying, and its objects, as we have already said, is the conversion of starch into sugar. Within the past twenty-five years innumerable inventions have completely revolutionized the old methods of the maltster, and placed this manufacture among the most advanced industries. From present indications it appears that the future of malting belongs to the pneumatic process,



which is already employed in a few of the largest establishments.

Our statistical exhibits show that the consumption of malt in our country is proportionately as large as that of most beer-producing countries; and, necessarily, the cultivation of barley in the United States is in proportion thereto. The area devoted to barley growing, in 1888, embraced nearly three million acres, the exact figures being 2,996,382 acres. In 1867, only 1,311,217 acres were so cultivated. The cost of the raw grain always fluctuated considerably, at the time when production had not yet adjusted itself to the demand. Thus, from 1868 to 1875 prices ranged from 81 cents to $1.30 per bushel; while from the latter year to 1888 the average price, per bushel, was sixty-two cents. The total value of the latter year's crop amounted to $37,672,032. We have this advantage over England, that we need not draw upon foreign countries for any part of our supply of barley, except when a particularly fine grade of grain is desired, such, for instance, as our neighbors on the St. Lawrence raise. In case of necessity we might do without any foreign barley; England, on the other hand, imports large quantities from Russia, Austria, and the States on the North coast of Africa, and is dependent upon these foreign supplies. We export one and a half million bushels, and import about eleven million bushels; hence, our own production being 63,884,000 bushels, we have, for home-consumption, 73,443,000 bushels. These figures apply to the years 1888–89. In this connection the following table may be of interest.

Production of Beer. Hectoliters.	Consumption of Malt. 100 Kilo.	Consumption of Hops. 50 Kilo.
German Empire.....47,602,939	18,208,410	385,000
Gt. Britain and Ireland..46,852,991	18,939,700	580,000
U. S. of America.....36,918,844	13,861,500	300,000

We use as much malt, proportionately, as either country, but much more hops than is used in Germany, considering the quantities of beer produced in both countries. Great Britain and Ireland consume a still greater proportion on account of the manufacture of immense quantities of export beer, which must be heavily "hopped," in order to withstand the effects of transportation to distant countries and the frequent changes of temperature to which it is subjected.

Even a superficial consideration of the authentic data here given, will convince the reader that we are justified in asserting, that barley-malt still constitutes eighty per cent. of the material used in the manufacture of American beer. In Hell Gate Brewery the quantity of malt used in 1890 amounted to eight hundred thousand bushels.

"HERE'S TO YOUR HEALTH."